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EDITED BY

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Revisions of Ceylon Fungi

PART VII

BY

T. Petch, B.A., B.Sc.

273.—Lepiota carpophylla B. & Br.

This was described by Berkeley and Broome as "Pileo convexo obtuso subcarnoso subfulvo, centro pulverulaceo, margine fibrilloso; stipite recto concolori e farcto cavo; annulo descendente mobili candido; lamellis stramineis ventricosis postice attenuatis approximatis. Pileus 2 inches across, dull tawny, convex, pulverulent in the centre, fibrillose towards the margin; stem $1\frac{3}{4}$ inch high, $\frac{1}{4}$ thick, of the same colour, even; ring descending, moveable; gills $1\frac{1}{2}$-2 lines wide, ventricose, straw-coloured, attenuated behind, approximate; spores broadly ovate, .00025 inches long."

This grows at Peradeniya among grass, usually solitary. The pileus is 4.5-7.5 cm. diameter, broadly convex or almost plane, feebly umbonate, red-brown in the centre becoming paler outwards, or streaked radially with red brown, on a pale brownish white or pale coffee-coloured ground, the surface splitting into minute, adpressed, fibrillose scales. The stalk is 4-5 cm. high, about 1 cm. diameter, almost equal, stout, pale brown, covered with very minute brown points, stuffed then hollow. The ring is ascending, moveable, stout, white internally, brownish externally, with red-brown warts on the upper edge. The gills are white, then cream or with a brownish tinge, free, crowded, 5 mm. broad, equal, rounded exteriorly, rounded or attenuated behind. The spores are white, oval, 5-6 $\times 3\,\mu$.

Berkeley and Broome's description of the pileus and stalk would appear to be a misinterpretation of the painting sent by Thwaites. The species differs from *Lepiota erythrogramma* in the darker colour of the pileus, and in its stout coloured stalk.

274.—Lepiota leontoderes B. & Br.

In Ann. Perad., IV, p. 383, this species was considered identical with *Lepiota phlyctanodes* B. & Br. Specimens recently collected at Peradeniya have shown that it is distinct.

The pileus is broadly conical, umbonate, becoming repand, up to 8 cm. diameter, dull tawny brown, darker fuscous in the centre, minutely adpressed silky, the surface broken concentrically, covered with scattered, irregular or subconical, corky warts. The flesh is white and compact. The gills are white or cream-coloured, moderately crowded, widely free, not rounded behind, narrow, somewhat dry. The stalk is up to 8 cm. high, 9 mm. diameter below, slightly attenuated upwards, truncate at the base, tawny brown and innately squamulose or striate with brown lines at the base, becoming paler upwards, almost solid, with a narrow central cavity. The veil is dependent, almost arachnoid towards the margin. The spores are white, narrow-oval, 4-6 $\times$ 2·5-3μ.

275.—Lepiota ceramogenes B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon No. 50, from Thwaites 1191 cum icone, as "Pusillus, stramineus ; pileo e campanulato convexo umbonato glabro vel parce granuloso margine appendiculato ; stipite brevi, annulo fugaci ; lamellis ventricosis candidis approximatis. On the soil of flower pots, June 1869. Pileus 2-3 lines across, campanulate, then plane and umbonate, straw-coloured, smooth or slightly granulated, margin appendiculate, even ; stem $\frac{1}{3}$ inch high, $\frac{1}{3}$ line thick, having a few fragments of the ring above ; gills white, ventricose, $\frac{1}{2}$ line wide : spores oblong, ·00025 long. The gills turn red in drying."

This was re-discovered at Peradeniya in June 1919, growing in flower pots. The pileus is at first hemispherical, or conico-campanulate, becoming broadly convex, or plane, even or obtusely umbonate, up to 8 mm. diameter, lemon yellow at first, becoming pale yellowish white, and almost white when old ; it is densely pruinose with minute warts which are composed of spherical thin-walled cells up to 40μ diameter. The margin is appendiculate. The gills are white, broadly ventricose, rather distant, free but close to the stem. The edge of the gill bears a few cystidia, either broadly clavate with a rounded apex, or cylindric, narrowed above, with a truncate apex, 24 $\times$ 10μ. The stalk is up to 1 cm. high, 1 mm. diameter, equal, or slightly inflated below, pinkish white, fuscous towards the base, pruinose. In my specimens, the whole of the veil is attached to the margin of the pileus. The spores are white, oblong oval, 4-5 $\times$ 2·5-3μ. The gills turn dark in drying. It grows in groups of about half a dozen.

In Fungi of Ceylon, No. 71, Berkeley and Broome described *Lepiota melichroa*, from Thwaites 743 cum icone. The description is "Pileo hemisphaerico umbonato pulverulento estriato ; stipite gracile flexuoso pulverulento, annulo obsoleto ; lamellis candidis. On the ground,

Peradeniya, Sept, 1868. Gregarious ; pileus not half an inch across, honey-coloured, pulverulent, as is the flexuous stem, half an inch high, $\frac{1}{3}$ line thick ; gills white, dark when dry ; spores oblong ·0002 long."

From the figure and the herbarium specimens, *Lepiota melichroa* is identical with *Lepiota ceramogenes.*

276.—Collybia endochorda B. & Br.

In Ann. Perad., IV, p. 374, the writer combined this species with that which Berkeley and Broome referred to *Amanita vaginata* Bull. A specimen recently collected, however, (June 1923) shows that this allocation was incorrect ; *Collybia endochorda*, though it has a stalk which closely resembles that of some forms of the *Amanita*, has a different pileus, as shown in the original painting.

The pileus is about 7 cm. diameter, broadly convex, then irregularly repand, depressed in the centre, dark blackish brown, becoming paler when dry, glabrous, with a cartilaginous cuticle, which is radially ridged and puckered. The flesh is white. The gills are white, rather distant, adnate, with a decurrent tooth, slightly ventricose behind, arcuate towards the outer end. The stalk is about 7 cm. high, 7 mm. diameter, expanded at the base, slightly attenuated upwards, white and longitudinally striate above, clothed below with clusters of minute grey-brown or blackish points often arranged in transverse bands, stuffed ; it has a conical root attenuated below into a narrow cord. The spores are white, globose, 12-14μ, or broadly elliptic, 13-15 × 12μ, with a large conical apiculus.

The original painting shows a longer stalk, more attenuated upwards, and a pileus rather bright brown in the centre, with a well-defined, dark brown, outer ring.

The species referred by Berkeley and Broome to *Amanita vaginata* differs slightly from the British form, but it appears to be too close to be separated from it. The pileus is up to 10 cm. diameter, at first broadly conico-convex, then almost plane, obtusely umbonate and depressed round the umbo, at first blackish, then lilac grey or brownish grey, slightly viscid at first, tuberculato-sulcate in a broad zone at the margin, frequently splitting, rarely bearing fragments of the volva. The stalk is up to 21 cm. high, 2 cm. diameter at the base, attenuated upwards, purple grey or lilac grey, densely silky fibrillose, the outer layer usually cracking transversely so that the stalk shows white and grey irregular transverse bands, stuffed then hollow. The gills are free, narrow, almost equal, attenuated outwards, rather crowded, with a crenate edge, white, sometimes becoming pale grey, and usually acquiring a brown edge. The spores are globose, 8-12μ diameter, with a large apiculus.

The volva is white, spongy, pointed below, up to 6 cm. high and 5 cm. diameter.

Volvaria geaster B. & Br. is a specimen of *Amanitopsis vaginata* emerging from the volva, the sulcate margin of the pileus being just evident.

277.—Hygrophorus tricolor B. & Br.

Hygrophorus tricolor was described by Berkeley and Broome (Fungi of Ceylon, No. 366) as " Pileo primum digitaliformi demum expanso umbonato glabro ; stipite candido subcavo glabro ; lamellis versicoloribus truncato-adnexis (No. 794, cum icone). Pileus 1·5-1·75 inches across, at first obtusely conical, yellow in the centre, scarlet towards the lobed margin, then expanded, umbonate, slightly striate, smooth: flesh reddish beneath the cuticle ; stem 2 inches high, 0·25-0·3 inches thick, nearly equal, white, smooth, stuffed ; gills ventricose, truncate behind, adnexed, variously shaded with yellow and red. Spores 8.75-10μ long, broadly elliptic."

I have not met with any *Hygrophorus* which answers exactly to Berkeley and Broome's description. It is possible, however, that a species which has been collected at Henaratgoda may be *Hygrophorus tricolor*, though it differs in several respects from the description and figure. It is described here provisionally under Berkeley and Broome's name, as it is worthy of record on account of its peculiar coloration.

In some specimens the pileus is uniformly red or yellowish red. In others, there is a central circular yellow area, occupying about half the surface of the pileus, with a red outer zone, the two colours being separated by a distinct, deep red line. Other specimens have half the pileus red and the other half yellow, while others have a red pileus with one or more well-defined yellow sectors extending from the centre to the circumference. The colour of the gills corresponds with that of the pileus ; beneath the red areas the gills are red, while beneath the yellow areas they are yellow, the two colours being sharply defined. If the pileus is red, the stalk is red, or red with yellow transverse patches, but if the centre of the pileus is yellow, the stalk is yellow. The fungus grows in troops, and all the variations described occur together.

The pileus is up to 1·75 cm. diameter, convex, then almost plane, feebly umbilicate in the centre, becoming hoary when drying; when quite dry it turns white. The stalk is up to 2·75 cm. high, 3 mm. diameter, equal and terete, or flattened and lacunose, expanding upwards, glabrous, stuffed. The gills are moderately distant, thick, ventricose, with an irregular edge, sinuato-decurrent.

Berkeley and Broome describe the gills as truncate behind and adnexed. In the figure they appear to be free. In view of the diffi-

culty of ascertaining the nature of the attachment of the gills from dried specimens, and the probable error of a draughtsman unacquainted with mycology, these differences might be regarded as unimportant. But the figure shows a white stalk, and if that is correct it is probable that the species here described is not *Hygrophorus tricolor*. On the other hand, it would appear improbable that two species should have the same peculiar coloration of the pileus.

278.—**Pluteus phlebophorus** Ditm.

This species was recorded for Ceylon by Berkeley in Decades of Fungi, No. 149 (Hooker's London Jour. Bot., VI, p. 479) from specimens sent by Gardner, the collection number being Gardner 46. The record was repeated in the Fungi of Ceylon, No. 178, but no specimens of this species were sent by Thwaites. On reference to Gardner's painting, No. 46, it is seen to be a fairly good representation of *Oudemansiella apalosarca*, and an examination of the specimens confirms this. The specimens, three in number, are small, not exceeding 2.5 cm. in diameter, but they show the characteristic spherical spores, 16μ diameter.

In Fragmente zur Mykologie, Mitt. VI. p. 1, von Höhnel referred *Oudemansiella apalosarca* (=*Collybia apalosarca* B. & Br.) to *Oudemansiella Canarii* (Jungh.) v. H. (=*Agaricus Canarii* Jungh.). Junghuhn described his species as having free, narrow gills and a volva, and stated that it grew on living branches of *Canarium commune*. *Collybia apalosarca* has broad gills, adnate or adnato-decurrent, and though it has a thin universal veil, it does not show any volva when expanded. Further, it always grows on dead wood. Practically the only resemblances between *Collybia apalosarca* and the description of *Agaricus Canarii* are that the stalks are solid, the spores abundant, and the pileus (more or less) white. If there is no type specimen of Junghuhn's species in existence, it scarcely seems possible to correlate it with *Collybia apalosarca*, in view of the discrepancies between the two descriptions. Under such circumstances, identification is merely guess-work, and it would seem preferable, if any stability of nomenclature is to be attained, that such indecipherable descriptions should be discarded.

279.—**Hypholoma fasciculare** (Huds.) Fr.

Hypholoma fasciculare was recorded for Ceylon by Berkeley from specimens collected and figured by Gardner (Gardner No. 45, *cum icone*). It was also recognised by Berkeley and Broome among the fungi sent by Thwaites, and was recorded in the Fungi of Ceylon, No. 274, from Thwaites Nos. 746, 759, *cum iconibus*.

There are four drawings of these numbers in Herb. Peradeniya, one of No. 746 and three of No. 759. No. 746 shows hemispherical pilei and is marked " young state " by Thwaites : it was labelled *A.* (*Hypholoma*) *fasciculare* by Berkeley. The figure of the mature examples of No. 759 was labelled with the same name, but a second figure 759, which shows broadly convex pilei and is indistinguishable from the figure of 746, was labelled *A.* (*Flammula*) *Janus* B. & Br., while a third figure of 759, in which the pileus is shown somewhat acutely umbonate, was also labelled with the latter name.

Flammula Janus was separated by Berkeley and Broome from Thwaites 759, and was described in Fungi of Ceylon, No. 207.

There is no difficulty in determining which Ceylon species was assigned to *Hypholoma fasciculare* by Berkeley and Broome, but one has considerable doubt in accepting their identification, and after considering the matter on several occasions it appears to me that it is preferable to regard the Ceylon fungus as a different species.

This species grows gregariously on dead stumps, either solitary, or in groups of three or four arising from the same point, but in the latter case the stalks separate widely from the base, and are not fasciculate. It usually grows laterally on the stump, not at ground level. Its mycelium runs through the soil, and appears at the surface in minute chalky-looking patches, from which tufts of sporophores are produced.

The pileus is at first hemispherical, then broadly convex, sometimes repand, even, or minutely umbonate with a rounded or acute umbo, yellow brown to reddish brown in the centre, pale yellow to greenish yellow outwards, smooth, up to 2·5 cm. diameter. The flesh is yellow, almost absent except over the stalk. The stalk is up to 4 cm. high, 2·5 mm. diameter, equal, greenish yellow, turning brown when handled, glabrous, shining, here and there lacunose, stuffed, then with a narrow central cavity ; there is no trace of a ring. The gills are narrow (2 mm.), very crowded, arched, attenuated outwards, adnato-decurrent, permanently greenish yellow. The spores are purple brown in mass, pale lilac by transmitted light, oval, inequilateral, 6-8 × 3.5-4 μ. Two kinds of cystidia are present, (a) clavate, or ovate, or subcylindric, often contracted in the middle, 16-32 × 8-12 μ, with a thickened apex, sometimes with a minute apical point, and with yellow-brown contents ; (b) flask-shaped, hyaline, thin-walled, 16 × 8μ.

The fungus has not a bitter taste. The gills are of four lengths and very crowded, a pileus 2 cm. diameter having 32 gills extending from the stalk to the margin, and a total of 256.

The fungus has considerable resemblance to *Hypholoma fasciculare*, but its colours are slightly different, and it is much smaller and less

robust. At first sight it might be regarded as a small form of that species, but it apparently differs sufficiently in its adnato-decurrent gills. It also differs in habit, not being fasciculate, in having a mycelium which travels in the soil from the host stump, and in not being bitter to the taste. When grown on a stump in a pot under cover of a bell glass, the spores which fall to the ground, or on ferns, etc., growing round the stump, soon germinate, and form lilac grey, or purple grey, fluffy masses of spores and mycelium covering the soil.

Flammula Janus was described by Berkeley and Broome as " Caespitosus, sulfureus : pileo convexo obtuso umbonatove carnoso ; stipite subaequali fistuloso glabro : lamellis angustis e subfusco ferrugineis (No. 759, cum icone). Caespitose, sulphur-coloured ; pileus 0·75-1 inch across, convex, obtuse, or umbonate, slightly fleshy, flesh lemon-coloured ; stem about an inch high, 1 line thick, curved, smooth, fistulose ; gills very narrow, arched, slightly adnate : spores ·00025-·0003 long by ·00015-·0002 (inches)".

The description agrees fairly well with that of the fungus assigned to *Hypholoma fasciculare*. It was, of course, drawn up chiefly from the figures, but there is nothing on any of them to warrant the statement that the gills are " e subfusco ferrugineis."

All the specimens of Thwaites 759 in Herb. Peradeniya are the same species, and there is no doubt that *Flammula Janus* B. & Br. and *Hypholoma fasciculare* B. & Br. *non* Fr. are identical. It may be known as *Hypholoma Janus* (B. & Br.).

The specimens assigned to *Hypholoma fasciculare* by Berkeley from Gardner's collection (No. 45) appear from the figure to be the same species. But those assigned to *Hypholoma sublateritium* from the same collection (Gardner, No. 89) are more probably *Flammula rhodomala* (B. & Br.)

280.—**Psathyra obtusata** Fr.

In Fungi of Ceylon, No. 278, Berkeley and Broome recorded *Psathyra spadiceogrisea* Schaeff., from Thwaites 712***, 754, cum iconibus ; and in Fungi of Ceylon, No. 279, *Psathyra obtusata* Fr., from Thwaites 711*, 712, 829, cum iconibus. On the paintings named by them, 711* and 829 are marked *Psathyra obtusata*, while 712, 754, and one marked by Thwaites 712 ter, 754, and 778, are all labelled with the alternative names *Psathyra spadiceogrisea* and *Psathyra obtusata*. Evidently Berkeley and Broome were in doubt about these identifications.

As noted in Ann. Perad., VI, p. 322, Berkeley and Broome included several species under each name. Nos. 712 and 754 are the species described there as *Psathyra reticulata*. No. 829 is not the same as No.

712 ; there were two figures of No. 829, which might very probably represent the same species, but one of them was named *Psathyra amaura*. No. 711* has now been identified, and it proves to be neither *Psathyra spadiceogrisea* nor *Psathyra obtusata*.

Specimens identical with Thwaites 711* have been collected at Peradeniya, growing on decaying palm nuts. The pileus is broadly conical or conico-convex, up to 2.2 cm. diameter and 1.3 cm. high, rufous when moist, becoming pale brownish grey or greyish brown, and when old, blackish grey with a yellow tinge, minutely atomate, smooth, faintly striate at the margin or, when wet, almost up to the centre ; flesh thin, fragile. The stalk is up to 4 cm. high, 2·5 mm. diameter, slightly attenuated towards the apex, white, smooth, shining, fragile, hollow, usually curved and tomentose at the base. The gills are moderately crowded, adnate, subventricose, outer ends acute, pallid becoming pale purple brown ; the edges bear cylindric or ovoid cystidia, 26-32 $\times$12-14μ, narrowed abruptly below into a short stalk, and numerous ovoid or subglobose cells, 20-24$\times$14-16μ. The spores are pale purple brown in mass, almost hyaline by transmitted light, oblong-oval, inequilateral, apiculus excentric, 6-9$\times$4-5μ.

This species has more crowded gills than *Psathyra obtusata* and is more regularly conical. It differs from *Psathyra spadiceogrisea* in shape and colour, and in the colour of the spores. It may be known as *Psathyra rufescens*. Type specimen and painting, No. 6560 in Herb. Peradeniya.

281.—**Psathyra efflorescens** B. & Br.

Psathyra lucipeta B. & Br.

Psathyra efflorescens was described by Berkeley and Broome in Fungi of Ceylon, No. 282, as " Gregarius ; pileo hemisphaerico materie saccharino obsito : stipite curvo tenui e strato tomentoso candido oriundo: lamellis adnatis. On dead mossy trunks. Peradeniya, Nov. 1867. Pileus $\frac{1}{4}$ inch across ; spores brown-purple, ·0003 long. Habit of *A. corticolor*." There are specimens and a painting in Herb. Peradeniya (Thwaites 712 bis, 754, 778).

Psathyra lucipeta was Fungi of Ceylon, No. 284. It was described as " Pileo subhemisphaerico pallide carneo estriato ; stipite curvo glabro fistuloso ; lamellis angustis ventricosis postice rotundatis adnatis (No. 895, cum icone). On dead sticks. Peradeniya, Jan. 1869. Gregarious ; pileus $\frac{1}{2}$ inch across, nearly hemispherical, white, tinged with pink, darker in the centre, margin slightly crenate ; stem 1 inch high, $\frac{1}{2}$ line thick, curved, of the same colour as the pileus, smooth, fistulose ; gills narrow, ventricose, rounded behind, adnate ; spores ovate ·0003-·0004 long."

These two are the same species, *Psathyra lucipeta* being the young, or the dry weather, form. In one instance, when the fungus developed round an *Areca* stump in a plant pot at the laboratory, the specimens were *P. lucipeta* when observed on the first day, and *P. efflorescens* the following morning. It is frequent on dead stumps or logs, especially on palm tissue, usually fasciculate, often in dense masses.

The pilei are at first broadly convex, smooth, atomate, with a few loose scattered fibrils, white with a pinkish or purplish tinge, and with a dark spot in the centre. They become almost plane, up to 2·5 cm. diam., ashy, with a purple tinge when moist, usually slightly ochraceous in the centre, minutely radially corrugated and reticulated from the centre to the margin. The margin is even, sometimes slightly striate when moist, rarely somewhat crenate. The flesh is white, comparatively stout. Berkeley and Broome gave the diameter of the pileus of *P. efflorescens* as $\frac{1}{4}$ inch, but the figures show pilei 2·4 cm. diameter.

The stalk is white, shining, fistulose, brittle, hollow, up to 3·5 cm. high, 2·5 mm. diameter, white strigose at the base. The gills are narrow, rounded behind, ventricose, moderately crowded, adnate, sometimes with a decurrent line, pale purple. The spores are bright purple brown in mass, pale purple brown to almost hyaline by transmitted light, broadly oval or slightly quadrangular, 5-7×3-5μ. The edge of the gills bears oval or subglobose cystidia, 14-18×10-12μ.

282.—**Psilocybe bullacea** (Bull.) Fr.

Agaricus (*Psilocybe*) *bullaceus* Bull. was recorded for Ceylon by Berkeley and Broome in Fungi of Ceylon, No. 277, from Thwaites 838, *cum icone*. They added the note, "The Ceylon specimens have a perfect ring, but the spores are the same as in the ringless specimens. The species evidently varies in this respect as regards European specimens."

This species grows on dung. The pileus is hemispherical or broadly convex, sometimes umbonate, up to 3·5 cm. diameter, bay brown or blackish brown when moist, becoming ashy or yellow brown or grey brown when dry, glabrous, striate at the margin to about one third the radius when moist, even when dry, slightly viscid, with a very thin separable pellicle. The flesh is thin, and usually thin over the stalk. The stalk is up to 4·5 cm. high, 2·5 mm. diameter, equal, white or brownish white or pale brown, shining, minutely longitudinally silky, hollow, furnished with a rather stout, usually rigid, horizontally-spreading ring at about two-thirds its height. The gills are pallid, then purple-brown, with a whitish edge, distant, strongly triangular with the lower edge usually markedly arcuate, adnate with a decurrent tooth, or decurrent, up to 1 cm. broad behind, usually with a subacute angle be-

tween the pileus and the stalk. The spores are violet, sometimes reddish purple, lemon-shaped, with a minute hyaline nipple at one or both ends, 11-15×7-9μ. The gills bear small cystidia, flask-shaped, about 24μ high, 8μ diameter below, 3μ above.

This closely resembles *Psilocybe bullacea* in its general appearance and its viscid separable pellicle. But its spores, judging from the published descriptions, are larger, and different in both colour and shape. The shouldered lemon shape is well marked. If the presence of a ring is a generic distinction, this species must be placed in *Stropharia*, and the shape of the spores agrees with that of other species in that genus. Accordingly, it may be known as *Stropharia pseudo-bullacea*.

In Cooke's figures of *Psilocybe bullacea*, Illustrations of British Fungi, No. 608, the large specimen and its longitudinal section (the two upper figures on the left) are apparently taken from the Ceylon figures, Thwaites 838 of Dec. 24, 1868. The colour is much brighter than in the original painting, but the shape and stature are the same. Cooke, however, modified the figures by omitting the ring on the figure of the whole fungus, and making the gills in the longitudinal section less decurrent; or it may be that the alterations were made by Berkeley's copyist. In the longitudinal section, the flesh over the stalk is depicted thicker than usual, and the angle between the pileus and the stalk more rounded, but in these respects the copy faithfully reproduces the original painting.

283.—Panus coriaceus B. & Br.

In Fungi of Ceylon, No. 421, Berkeley and Broome described this species as "Pileo dimidiato subreniformi coriaceo rufo zonato, postice velutino, antice lineato rugoso, margine tenui crenato; lamellis ventricosis pallidis (No. 1124). On dead wood. Central Province, Feb. 1869. Pileus 1-2 inches across, coriaceous, zoned, of a rich red brown, velvety behind, marked in front with minute raised lines which sometimes form reticulations: gills pallid, spinulose." In Saccardo, Sylloge, V, p. 628, the name was changed to *Panus Berkeleyi* Sacc. & Cub., because of the prior existence of *Panus coriaceus* Berk. from Australia.

I have only met with this species once, and then neglected to gather much, being completely misled by its appearance in the field. It grew on the lower surface and sides of a prostrate log, in long resupinate patches up to a foot in width, from the margin of which there arose dimidiate, flabelliform pilei up to 4 cm. long. When fresh, it was cream or pale yellow, with a general resemblance to *Daedalea flavida*, but softer. The resupinate part was covered with large pores, irregular or hexagonal, 1-2 mm. in diameter, and 5 mm. deep. Towards the margin, the pores become larger and elongated, and on the flabelliform pilei

they give place to parallel gills, which may unite into pores at the acute margin.

The colour and texture of the dried specimens are quite different from those of the fresh specimen. The fungus becomes brownish yellow, zoned concentrically with narrow red brown bands, and finally dark red brown with purple brown bands, or wholly purple brown. It loses its tomentose appearance, and becomes hard and horny, radially ridged, and sometimes with minute anastomosing ridges in addition.

As noted by Berkeley the gills are spinulose, with erect, rigid spines consisting of fascicles of hyphae.

Mr. Lloyd kindly pointed out to me several years ago, that this species had been distributed from the Philippines as *Elmeria cladophora* (Berk.) Bres. The specimen of the latter in Herb. Peradeniya is Bureau of Science, 4213 : it has longer pilei and narrower gills than the Ceylon form, and is not concentrically zoned.

The genus *Elmeria* was proposed by Bresadola in Hedwigia, LI (1911), p. 317, the name being changed by him to *Elmerina* in Ann. Myc., X (1912), p. 507. The genus was established on *Hexagonia cladophora* Berk. and *H. vespacea* Pers., and subsequently Bresadola transferred to it *Poria setulosa* P. Henn.

That *Panus coriaceus* is not a good *Panus* is self-evident. If the genus *Elmerina* is retained, this species will stand as *Elmerina Berkeleyi* (Sacc. & Cub.). It is, however, doubtful whether a genus can be maintained solely on this character of the setae, as it will include species which are widely different in other respects.

284.—**Polystictus zeylanicus** Berk.

In " A preliminary list of Ceylon Polypori " (Ann. Perad., VI, pp. 87-144), I stated that *Polyporus zeylanicus* Berk. required comparison with *Hexagonia pergamenea* B. & Br., since specimens from the Philippines which were identical with *Polyporus zeylanicus* had been distributed as *Polystictus pergameneus* (Berk.) Bres. I have not been able to find any publication of the latter name. Subsequently Mr. C. G. Lloyd (*in litt.*) informed me that in his opinion *Polyporus zeylanicus* Berk. was identical with *Polyporus Peradeniae* B. & Br.

During my recent leave in England, I re-examined the type specimens of *Polyporus zeylanicus* and allied species from Ceylon, and have come to the conclusion that *Polyporus zeylanicus* Berk., *Polyporus Peradeniae* B. & Br., *Polyporus personatus* B. & Br., *Polyporus diversiporus* B. & Br., and *Hexagonia pergamenea* B. & Br. are all the same species. It appears to be identical with *Polyporus cervino-gilvus* Jungh. from Java, while from the Philippines it was named *Trametes dermatodes* by Léveillé.

None of these names was included by Bresadola and Sydow in their Enumeration of Philippine Basidiomycetes in Philippine Journal of Science, IX C., p. 345 (1914). Graff, in Philippine Basidiomycetes II, Philippine Jour. Sci. IX C, p. 239, lists *Polystictus cervino-gilvus* (Jungh.) Fr., with the synonyms, *Trametes dermatodes* Lév. and *Polyporus Peradeniae* B. & Br.

Polyporus zeylanicus was collected in Ceylon by König, and described by Berkeley in "Notices of Fungi in the Herbarium of the British Museum" (Ann. Nat. Hist., X (1842), pp. 369-384). The type specimen is in the British Museum (Natural History). The fungus is orbicular, plane, thin but rigid, up to 1·75 mm. thick, the context 0·6-0·8 mm. thick and the pores 0·4-1·2 mm. deep. The colour is brown or tawny brown, and the surface is rough with radial raised ridges or bands of hyphae, sometimes broken into coarse sub-erect fibrils. Between the ridges it is glabrous and shining. The pore surface is slightly darker, with a sterile zone at the margin, followed by oval, developing pores 0·3-0·4 mm. diameter, but further back the pores are up to 0·9 × 0·5 mm., more or less elongated. The dissepiments are up to 0·06 mm. thick, woolly or tomentose, and somewhat produced at the angles. The interior of the pores is ashy, but the hymenium is undeveloped, and no cystidia were found. The context consists of hyphae, 3-6μ diameter, yellow-brown in mass, pale yellow when isolated, many of them solid: there are numerous yellow-brown, globose, spore-like bodies, 4μ diameter, in the context. This species was not recognised again by Berkeley in Gardner's or Thwaites's collections.

Hexagonia pergamenea was described from specimens sent to Berkeley by Thwaites in 1851 and 1854, but the name was not published until 1873, in Fungi of Ceylon, No. 526. The two specimens, now in Herb. Kew, appear to be the same species. The sheet has been recently marked *Polystictus Berkeleyi* Bres., a name which was published in Ann. Myc., XIV, p. 231. They are resupinate, with a narrow free margin. The pore surface is pale brownish white. The developing pores near the margin are 1-2 mm. diameter, while further back they are oval, up to 2 × 1 mm., or forming long lines, 6 mm. or more long and 1 mm. wide, with lower cross walls. The dissepiments are thick and woolly. The margin is flat, thin, and rigid. The upper surface is tawny brown, with radially arranged superficial fibres, not so strongly developed as in *P. zeylanicus* and tending to become matted tomentose. The context is the same as in *P. zeylanicus*. The hymenium is undeveloped, and no cystidia were found.

Polyporus Peradeniae was described by Berkeley and Broome from Thwaites 221 in Fungi of Ceylon, No. 478. They stated that the

hymenium varied from flesh colour to yellowish olive. The specimens are resupinate, with a free lobed margin up to 2 cms.broad, extending laterally for several inches. The free part is thin, flexible and rather soft. The pore surface is pale yellowish brown with more or less hexagonal pores, 0·3-0·5 mm. diameter in front and up to 1 mm. diameter behind. The dissepiments are thin and produced at the angles. The hymenium bears hyaline cystidia, cylindric, tapering upwards, 25×5-8μ, sometimes slightly inflated below. The upper surface is silky tomentose, with adpressed hyphae arranged more or less in broad, close-set, radial fascicles. The context is the same as in *P. zeylanicus*.

Polyporus personatus was described by Berkeley and Broome in Fungi of Ceylon 479, from Thwaites 133, 535. There are specimens in Herb. Kew and Herb. Peradeniya. Berkeley and Broome described it as dimidiate, sometimes attenuated behind and fixed by the vertex. In the type specimens and in recent collections, it is variable in that respect. In some parts, it may be resupinate with a broad free margin exactly as in *P. Peradeniae* ; in other parts of the same gathering, the free margin takes the form of flabelliform or orbicular pilei attached by a narrow base ; while elsewhere there may be no effused resupinate part, but only dimidiate pilei attached over a small dorsal area.

In the type specimens of *P. personatus*, the pores are more or less hexagonal, 0·8-1·2 mm. diameter, or 0·5-0·8×0·9-1·2 mm., or forming long lines on the resupinate part. The dissepiments are thin, and frequently produced at the angles. The sterile margin is wanting. Fresh specimens are salmon pink on the under surface ; Berkeley and Broome described the hymenium as flesh-coloured to pale tawny. The upper surface is tawny brown or yellow brown, often with a yellow margin ; it is matted tomentose, with a slight radial arrangement of the hyphae, obscurely concentrically sulcate. The context is the same as that of *P. zeylanicus*. The hymenium bears hyaline cystidia, usually strongly encrusted above, either ovate, 12×7 μ, or ovate with a solid conical or cylindrical tip, 18×8 μ, in the type specimens. In a recent collection the cystidia are ovate or flask-shaped, 25×9μ.

Professor S. R. Bose has shown me specimens from India which are *P. personatus* in their dimidiate, dorsally affixed shape, but have the upper surface covered with erect coarse hyphae to a much greater extent than in the type of *P. zeylanicus*.

Polyporus diversiporus was described by Berkeley and Broome in Fungi of Ceylon, No. 491, from Thwaites 535 (in part). The type in Herb. Kew contains two species, *P. diversiporus* and *P. Peradeniae*. *P. diversiporus* is resupinate with a narrow free border. Its pores towards the margin are more or less circular, 0·4-1 mm. diameter, or oval, 0·7-

0·8×0·8-1 mm.; further back they may be 2 mm. long and 0·6 mm. wide, tending to an arrangement in long lines. The dissepiments are thick and tomentose, and the fungus appears stouter than the usual forms of *P. Peradeniae*. The hymenium is undeveloped, and no cystidia were found. The upper surface is matted tomentose with an obscure radial arrangement. In some places there is an almost glabrous zone bordering the line of attachment.

The differences between the various specimens are chiefly differences of development. At first the dissepiments are thick and tomentose, but they become thin as the pores lengthen. When the hymenium is fully developed the colour changes from yellow or yellow-brown to salmon pink. In the commoner forms the upper surface is clothed with adpressed, somewhat silky hyphae, arranged more or less in radial fascicles, but in the form named *Polystictus zeylanicus*, the hyphae form coarse fibrils which curve upwards and become suberect.

The specimens from the Philippines which Bresadola referred to *Polystictus pergameneus* (Berk.) Bres. *i.e. Hexagonia pergamenea* B. & Br., are clearly identical with *Polystictus zeylanicus*. Lloyd holds that *Polyporus Peradeniae* and *Hexagonia pergamenea* are identical with *P. zeylanicus*. Graff includes *Tramètes dermatodes* and *P. Peradeniae* as synonyms of *Polyporus cervino-gilvus* Jungh. To the latter may now be added *P. diversiporus* B. & Br., *P. personatus* B. & Br., *P. zeylanicus* Berk., and *Hexagonia pergamenea* B. & Br.

The selection of the name *Polystictus Berkeleyi* Bres. for this species was unfortunate, as liable to confusion with *Polyporus Berkeleyi* Fr.; and the possibility of confusion is increased by the fact that *Polystictus Berkeleyi* Bres. is synonymous with *Polyporus zeylanicus* Berk., while *Polyporus Berkeleyi* Fr. is synonymous with *Polyporus Zealandicus* Cooke.

It is of interest to note that Thwaites 133 provided *Polyporus personatus*, and Thwaites 535, *Polyporus personatus*, *P. diversiporus*, and *P. melleus*. In Herb. Kew, *Polyporus personatus*, Thwaites 133, 535, are on the same sheet and there is no distinguishing mark ; similarly the type of *Poria mellea* is marked 133, 535. In Herb. Peradeniya, Thwaites put all his duplicates of 133, 535 together, adding another number, 650, *P. variolosus*, and the specimens consist of three pieces referable to *P. diversiporus*, one of *P. personatus*, and two of *P. variolosus*. Evidently Thwaites considered that all these were the same species. *Poria variolosa* and *Poria mellea*, however, appear to be distinct from *Polystictus cervino-gilvus*.

Mr. C. G. Lloyd, to whom I submitted parts of the original collections of *P. diversiporus* and *P. personatus*, with recent collections

of the same species, informs me that he would consider them all forms of *P. cervino-gilvus*. Mr. Lloyd, however, holds that there are two species in the group which I have considered as one in this note, viz.,

1. *P. zeylanicus* Berk.; syn., *P. Peradeniae* B. & Br., *Hexagonia pergamenea* B. & Br.
2. *P. cervino-gilvus* Jungh.; syn., *Trametes dermatodes* Lév., *P. personatus* B. & Br., *P. diversiporus* B. & Br.

The distinction between these two would appear to lie in the character of the upper surface of the pileus. In *P. cervino-gilvus*, the tomentose covering of the pileus consists of silky hyphae, usually arranged in flat, more or less radial fascicles, but sometimes without definite arrangement. In *P. zeylanicus*, the hyphae are agglutinated into radial ridges, usually rough with recurved or suberect fibrils, and the spaces between the ridges may be glabrous. But on this character, it would seem that *P. Peradeniae* should be referred to *P. cervino-gilvus*, while *Hexagonia pergamenea* is intermediate. I would prefer to regard the more scabrid forms (*P. zeylanicus*) as probably climatic forms of *P. cervino-gilvus*; they appear to be rare in Ceylon.

285.—Polyporus epilinteus B. & Br.

In Mycologia, XIII, p. 84, Murrill refers *Polyporus epilinteus* B. & Br. to *Poria vincta* (Berk.) Cooke, and states that, according to Cooke, one of the original type specimens of *Polyporus epilinteus* has orange mycelium while the two others are without it.

I have not met with Cooke's statement, but, of the three specimens in the type of *P. epilinteus*, one is *Polyporus Kermes* B. & Br., and the other two *Polyporus zonalis* Berk., as recorded in Ann. Perad., VI., p. 105.

286.—Hexagonia velutina Pat. & Har.

In Synopsis of the Genus Hexagona, Lloyd records (p. 14) that a collection of *Hexagonia velutina* reached Berkeley from Ceylon and was referred by him to *Hexagonia variegata*. Apparently the record was never published by Berkeley.

The specimens in question are in the cover of *Hexagonia variegata* in Herb. Kew. The sheet is marked "Ceylon" only. It is not named by Berkeley, and, contrary to the usual practice with regard to Ceylon specimens, it bears neither date, locality, collection number, nor collector's name. The specimens appear to be part of the same gathering as those in another cover marked *Hexagonia membranacea* by Cooke, a name which apparently was not published.

In view of the lack of data on the herbarium sheet, and the fact that nothing resembling this species was recorded for Ceylon by Berkeley

or has been collected since, it would seem advisable to consider the statement that the specimens were collected in Ceylon as possibly incorrect.

287.—Cladoderris Thwaitesii B. & Br.

Cladoderris Thwaitesii was described by Berkeley and Broome in Fungi of Ceylon, No. 571, as "Minor, erecta, spathulata, extus glabrescens ; stipite subcylindrico compresso radicante (No. 1003). Peradeniya, Nov. 1868. About 2 inches high with the stem, $1\frac{1}{4}$ (inches) across at the top, becoming dark brown above ; hymenium pale rufous, distinctly veined." Specimens in Herb. Kew and Herb. Peradeniya have been examined.

This species is fairly frequent in decaying clumps of the Giant Bamboo (*Dendrocalamus giganteus*), but its growth appears to be arrested in very many cases at an early stage, and the fully-developed pilei are rare.

The pilei are cuneate to flabelliform, up to 6 cm. high, lobed and incised above, up to 4 cm. broad, usually shortly stalked, but sometimes with a rooting base up to 5 cms. long. In general they occur in clusters, arising from a common base, but they may be scattered, and in the latter case they frequently have a long rooting base embedded among the bamboo roots. The pilei stand erect, or suberect, with the lateral edges recurved, in rosettes after the manner of *Stereum elegans*, often with the pilei confluent above. The clusters are, however, taller than those of the latter species, and they have quite a different appearance.

The upper surface of the pileus is pale buff, or pale ochraceous, with a white margin, sometimes obscurely zoned towards the margin, sometimes wholly white ; it is minutely tomentose, and radially (longitudinally) ridged. The stalk is white and tomentose. The hymenium is pale purple-grey at first, becoming cinnamon brown, and is usually slightly radially ridged or folded. The substance of the pileus is white, somewhat brittle when fresh, but tough when dry, fibrillose, not cartilaginous.

When bruised, the hymenium turns dark red, this colour rapidly changing to dark purple brown or chocolate brown. The context undergoes the same colour change when cut.

The basidia are 5μ diameter, four-spored, with slender sterigmata up to 8μ long. The spores are hyaline, globose, smooth, 5-8 μ diameter. Cystidia were not found.

This species is a *Stereum*, and will stand as *Stereum Thwaitesii*. The folds or ridges on the hymenium appear more prominent on the dry, than on the fresh specimens, owing to their discoloration when the specimens are pressed.

288.—Peniophora Habgallae (B. & Br.) Cooke.

Berkeley and Broome described this species in Fungi of Ceylon, No. 645, as *Corticium Habgallae*, "suborbiculare ceraceum ochroleucum, margine tenui tomentoso uno latere elevato ; hymenio subtiliter setuloso (No. 339). On dead bark. Habgalla." Cooke, in Grevillea, VIII, p. 20, transferred it to *Peniophora*, stating that the cystidia (metuloids) were narrowly fusiform, attenuated and smooth above, 70-80 × 12·5μ. Massee, in Jour. Linn. Soc., XXV, p. 142, repeated Berkeley and Broome's description, adding that the cystidia were fusoid, 60-70 × 12μ, and the spores subglobose, 5-6μ. Massee stated that the fungus formed "more or less elliptical patches about 1 in. long by ½ in. wide, and in every instance with a tendency to become reflexed on one side, thus forming a transition from the truly resupinate to the reflexed species." The name of the locality should have been Hakgala.

The fungus is common at Hakgala on dead branches of *Cinnamomum Camphora*. It is pezizoid, circular or oval, regular or somewhat lobed, up to 1·5 cm. diameter. The upper surface is plane or undulating, with a sharp definite margin, from which the convex sides curve backwards slightly into the flat base, which is attached to the host plant only over a central area. When fresh, the fungus is up to 3 mm. thick, but it contracts to a disc, 0·5-1 mm. thick, on drying. The fresh specimens are fragile, with a fleshy cortex and hymenial layer, but subgelatinous internally ; the colour of the hymenium is white, or pallid with a white margin, while the lower surface is white. The hymenial layer is about 0·15 mm. thick, and the cortex at the base and sides 0·1 mm. thick. The cystidia are hyaline, flask-shaped or conical, encrusted, wall slightly thickened, 80-100 μ high, 14-20 μ diameter below. The spores are oval, smooth, hyaline, 16-21 × 12-14 μ. The lower surface is slightly tomentose towards the margin, and it becomes concentrically grooved in drying.

The "uno latere elevato" of the original description was probably an accident of growth, or a distortion in drying.

289.—Kneiffia gelatinosa B. & C.

This was described by Berkeley in Cuban Fungi, No. 363, as "Effusa, arctissime adherens, venosa, gelatinosa, pallida, papillis minutis farinosa. Resembling *Phlebia* in habit ; but the minute papillae, which have frequently little setiform appendages at their apices, bring it under *Kneiffia*. It may perhaps form a distinct genus, when *Hydnum gelatinosum* is separated." In Fungi of Ceylon, No. 569, Berkeley and Broome recorded the same species from Ceylon. Patouillard, Bull. Soc. Myc. France, VIII, p. 120, transferred it to *Heterochaete*, stating that the basidia

were claviform, 30×15 μ, two to four septate, the spores elongated oval, 20-25×8-10 μ, the promycelium short, 10-15 μ, and the conidia subglobose, 10 μ.

The Ceylon specimen, Thwaites 602, is resupinate, livid grey, horny, about 0·1 mm. thick, covered with short processes, which are conical, or cylindric, sometimes expanding above, sometimes flat topped, up to 0·1 mm. high and 50 to 150 μ diameter at the base. It is compact, with a thin yellow-brown basal layer, the remainder being hyaline and translucent, containing numerous, large, irregularly oval masses of calcium oxalate, up to 24×20 μ. The hymenium is continuous over the processes, and contains conical, hyaline, encrusted cystidia, 24-30 μ high, 8-10 μ diameter, projecting 16 to 20 μ, which are scattered over the flat surface, but clustered on the apices of the processes. The basidia are cylindric, 4 μ, diameter, with four short sterigmata.

The Ceylon species is not *Heterochaete*. The cystidia are those of a *Peniophora*, while the processes are those of *Odontia*. It is not *Scopuloides* of Massee, as the processes are not merely clusters of cystidia. It may may stand as *Odontia pallida*, nom. nov.

290.—Kneiffia discolor B. & Br.

Berkeley and Broome described this in Fungi of Ceylon, No. 564, as "Tenuis, submembranacea, lobata, margine angustissimo, lactea, granulis rufis. Spread over the bark. The edge sometimes free."

This species is not uncommon at Peradeniya. It is resupinate, adnate, effused, with a byssoid margin at first. When old, the margin becomes solid and may recurve slightly in drying. When fresh, it is lilac, with a white margin, becoming white when old. It bears numerous clavate or conical processes, up to 50 μ diameter below, projecting about 60 μ above the surface. Between the processes the hymenium is smooth or minutely pruinose. The total thickness of the fructification varies from 0·1-0·2 mm., and it differs considerably in structure from point to point. In general, the lower part is yellow-brown, composed of agglutinated hyphae, more or less parallel to the substratum ,with a hyaline upper layer about 60 μ thick. The processes, which are composed of parallel hyphae and are red-brown or yellow-brown by transmitted light, arise from the yellow-brown stratum. Where the stroma is thicker, the yellow-brown stratum divides into two, one part overlying the substratum and the other lying below the upper hyaline layer, the intermediate tissue being hyaline ; and the processes then arise from the upper yellow-brown layer. The intermediate hyaline tissue may consist either of more or less parallel hyphae like the basal layer, or of loosely interwoven hyphae. Where the stroma is very thin, the yellow-

brown basal layer is almost lacking, and the processes appear to arise from the substratum. Developing processes, within the context, are covered by masses of calcium oxalate, and these remain round the bases of the fully-developed processes. The hymenium contains somewhat irregular tubes, which stain more deeply with iodine than the remainder of the hymenium and appear to be gloeocystidia. The basidia are those of *Heterochaete*, and the species must stand as *Heterochaete discolor* (B. & Br.). Its spores are hyaline, oval, inequilateral, 8-10 × 5-7 μ.

Heterochaete tenuicula (Lév.) differs in its definite stroma, separable from the substratum, and in colour when fresh.

291.—Kneiffia coriacea B. & Br.

Berkeley and Broome described this species as "Crassa, rigida, secernibilis, hymenio pallide umbrino granulis albis sparso, margine lato fusco. 4 inches across; margin barren."

The specimen in Herb. Peradeniya, Thwaites 991, is about 7 cm. broad, and evidently extended for at least double that length. It is livid grey, with small white spots, and a broad, glabrous, black, or here and there reddish-brown, margin. It is separable from the substratum, and apparently sometimes free towards the margin. The lower surface is black, strigose or tomentose with rufous-brown tomentum, united to the substratum at several points and often concentrically zoned round the points of attachment. The fructification is rigid, and up to 1 mm. thick, the surface cracking on drying (?). The section viewed macroscopically shows yellow-brown hyphae below, then a dense, black, horny basal layer, followed by a dark rufous-brown layer for about half the thickness of the stroma, and an upper, more purple-brown layer of about the same thickness, mottled with white.

By transmitted light, the sub-basal hyphae are yellow-brown, regular, thick-walled or solid, up to 5 μ diameter, and form a loose weft up to 0·1 mm. thick. The basal layer is red-brown, about 0·15 mm. thick. The tissue above this, for about 0·3 mm., is pale yellow-brown, and composed of fused hyphae, more or less parallel to the substratum as in the basal layer. This merges into an upper layer, about 0·4 mm. thick, yellow-brown below, becoming hyaline above, stratose, of vertically parallel, fused hyphae, etc. The specimen shows three successive hymenia. The whole section is sub-translucent. The hymenium contains numerous gloeocystidia with red-brown contents (in the dry specimen); these are very slender, 1-2 μ diameter, below, with long clavate tips, 4-5 μ diameter. Scattered through the old hymenia are masses of crystals of calcium oxalate; these give the mottled appearance when the fungus is cut. In the current hymenium, these masses occupy cavities,

up to 100 μ deep and 100 μ diameter, open above ; the masses may project 20 μ above the surface, and they form the white dots. These masses do not fall out, but are buried by the subsequent growth of another hymenium. The basidia are 6 μ diameter, clavate, somewhat attenuated above ; the spores are hyaline, oval, inequilateral, acute at the ends, 5×3μ.

This species is a *Stereum* (*Lloydella*), and will stand as *Stereum* (*Lloydella*) *coriaceum* (B. & Br.).

292.—Kneiffia insularis B. & Br.

Berkeley and Broome's description of this species is " Tenuis, sparsa, irregularis, immarginata, lobata ; hymenio centro subumbrino ; granulis minutis." They added, " There is also what we suppose to be a younger state, in which the plant is white, with a pinkish-grey tinge in the centre. "

The specimen in Herb. Peradeniya is effused, in small, irregularly lobed patches, cream-coloured or pale ochraceous, pulverulent or byssoid, covered with minute processes. Sections show that the fungus is a mere film, sometimes up to 20 μ thick, sometimes barely covering the substratum. The processes are cylindric, up to 40 μ high, 20μ diameter, or irregularly globose, 50 μ diameter, or pulvinate masses partly embedded in the film. The context is composed of hyaline irregular hyphae, 1-2 μ diameter. The globose processes are superficial, and are masses of calcium oxalate bound together by a few hyphae ; on treatment with hydrochloric acid they disappear. The cylindrical processes, which are embedded in the film, are also composed largely of masses of calcium oxalate, but in some cases a loose column of hyphae is left after treatment with hydrochloric acid. The film contains ovoid basidia, 4×3 μ, in small clusters. The specimen is scarcely in a fit condition for determination, but it would appear to be a *Corticium*. The structure of the processes is not definite enough to decide its position.

The white species referred to by Berkeley and Broome is entirely different. It forms small, chalky-white, more or less circular patches, with scattered, minute, rounded elevations, about 0·1 mm. diameter. Where it is rubbed, it appears brown. It is about 0·2 mm. thick, with two well-defined layers, which readily separate from one another. The lower layer, about three-quarters of the thickness of the stroma, is composed of densely interwoven, yellow-brown hyphae, 2 μ diameter, not fused. The upper layer is hyaline, composed of irregularly flexuose hyphae, 2 μ diameter, bearing numerous branches which form, either short spines, or long slender hyphae 1 μ diameter, with minute, oval lateral conidia, 2·5×1·5 μ. It is not possible to decide what this is from this specimen, and it is doubtful whether it consists of one or of two fungi.

293.—Kneiffia chromoplumbea B. & Br.

This was described as " Luteo-fulva, margine tenui pulverulento byssoideo flavo ; hymenio granulato, setulis albis. Varying from chrome yellow to tawny. In one specimen, if really the same, the margin is white. It appears to turn brown when old."

From the specimen in Herb. Peradeniya (Thwaites 606), the fructification begins as an effused, bright chrome yellow patch, which acquires a thin, waxy or subgelatinous upper layer, and becomes rough with pulvinate tubercles, 0·2-1 mm. diameter, or irregular ridges ; some of these are due to irregularities in the substratum, but the majority are true variations in the thickness of the stroma. It appears to be densely covered, both on the flat and the elevated parts, with white cystidia, 0·1 mm. high, scattered or clustered, up to 40 μ diameter, usually clavate. These, however, are not true cystidia ; they consist of overlapping, more or less tabular masses of calcium oxalate, adherent to conical or cylindric processes, which are composed of parallel hyphae, compact, like the processes of a *Heterochaete*.

The fructification is up to 0·2 mm. thick in the flat parts, increasing to 0·5 mm. in the tubercles. In section the basal layer is red-brown, about 30 μ thick, and composed of agglutinated hyphae parallel to the substratum. The intermediate tissue is pale yellow, hyaline in thin sections, rather loose, and composed of slender interwoven hyphae. The hymenial layer is red-brown and somewhat horny in section, viewed as an opaque object, but translucent in thin sections. The upper part of the fructification contains numerous gloeocystidia with greenish-yellow contents ; these are narrow-oval, sometimes produced into a point above, 16-24 × 7-8 μ, with a slender stalk, 2 μ diameter ; they are situated at various depths and rarely reach the surface. The basidia are 6 μ diameter, four-spored.

Alcohol extracts a resinous or oily substance, which forms minute globules in water. On treatment with lactic acid, some parts of the pseudocystidia, and perhaps part of the contents of the gloeocystidia, dissolve, and the dissolved substance crystallises out again on the slide in radiating groups of long, greenish-yellow needles. These needle-shaped crystals do not dissolve in hydrochloric acid. Treatment with hydrochloric acid dissolves the tabular crystals on the pseudocystidia.

If a section is treated first with lactic acid and then with hydrochloric acid, the processes which form the foundation of the pseudocystidia are left free of any adhering substances, except some of the recently-formed needles. But if the section is treated first with hydrochloric acid, and the calcium oxalate masses dissolved, irregular masses of a greenish-yellow resinous substance remain adherent to the processes, and

subsequent treatment with lactic acid does not dissolve these or induce the formation of any needle-shaped crystals.

The combination of characters in this species makes its systematic position doubtful. For the present, I leave it under Berkeley and Broome's name, as it would appear to be equally out of place in any other established genus.

There is a single fragment of another species in Thwaites 606 in Herb. Peradeniya, apparently an immature *Asterostromella*. The Peradeniya specimen has not a white margin.

294.—Kneiffia isabellina B. & Br.

Berkeley and Broome's description of this species is "Tenuis, late effusa, margine tenuissimo pulverulento quandoque elevato ; hymenio isabellino, granulis minutissimis. Spreading far and wide ; surface continuous, of a delicate pinkish grey, covered with extremely minute granules."

Thwaites included under No. 655, a collection made in the Southern Province, July 1868, and another made in the Central Province, December 1868 ; and Berkeley and Broome cited both these as *Kneiffia isabellina*. In Thwaites 655 in Herb. Peradeniya, there are undoubtedly three collections, on different substrata.

The largest specimen, which is thin and widely effused, is pale brownish ochraceous, with a narrow, smooth, brown margin. The stroma is cracked near, and parallel to, the margin, which is not elevated in this specimen. The general surface is even, rough with minute, close-set granules arranged in irregular rows. The fructification is 0·3 mm. thick, internally pale-brown, mottled with white, when viewed as an opaque object. In sections by transmitted light, there is a very thin, yellow-brown, basal layer, scarcely differentiated from the remainder of the stroma. The context is pale yellow-brown or hyaline, somewhat in patches, and is composed of densely interwoven, agglutinated slender hyphae. It includes irregular, sub-cylindric masses of calcium oxalate, up to 0.2 mm. long and 50 μ diameter. These give the mottled appearance seen in section. Some of these masses are entirely immersed ; others reach the surface, and project up to 30 μ, forming the granules seen on the hymenium. Basidia have not been observed.

Another collection is represented by several small pieces. It was probably widely effused. The colour is slightly paler than that of the foregoing, and its surface is undulating. It has the same arrangement of granules. The margin differs, being narrow, of the same colour as the remainder of the fructification, tomentose, thick, and tending to separate from the substratum. The fructification is up to 1 mm. thick,

stratose, in two layers, the lower layer being about two-thirds the entire thickness. There is no marked basal layer. The context is the same as in the first collection, and it contains similar masses of calcium oxalate, up to 0·3 mm. long. The projecting ends of these masses are sometimes surrounded by a narrow up-growth of hyphae.

The third collection is effused, purple-grey, and has cracked into small areolae, exposing the inner tissue, which appears white in the cracks. It bears numerous projections, up to 75 μ high, either conical, up to 100 μ diameter at the base, or cylindric, up to 50 μ diameter. The fructification is 0.25 mm. thick, the internal tissue being yellow-brown to hyaline, rather compact, composed of slender irregular hyphae, sometimes agglutinated, sometimes loosely interwoven, without a differentiated basal layer, and containing large numbers of subglobose granules of calcium oxalate. The surface of the stroma, and the processes, are covered with similar granules, often resembling sphaerocrystals. After removal of the calcium oxalate with hydrochloric acid, the processes are found to consist of rather loose, more or less erect hyphae. Basidia have not been found.

The third specimen is perhaps an *Odontia*. The other two would appear to be identical with one another. Berkeley and Broome's description would fit the latter two together, but neither of them separately. But the only specimen which looks as if it could ever have been pinkish grey is the third. The first and second collection are probably a *Corticium*, but any change of name must be deferred until the type specimen in Herb. Kew has been examined.

295.—**Kneiffia Muelleri** Berk.

Grandinia papulosa B. & Br.

Kneiffia Muelleri was originally described by Berkeley from Australia in Jour. Linn. Soc., XIII, p. 167, as "Tota resupinata tenuis, junior farinulenta, senior continua hic illic rimosa granulis perithecii-formibus apice niveis. When the granules have fallen off, it looks like a *Porothelium*." It was recorded for Ceylon by Berkeley and Broome, with the note, "This very curious species is at once distinguished by the granules falling out and leaving little holes. The Ceylon specimens seem the same with those from Australia, but are of a purer white."

The specimen (660) which Thwaites retained in Herb. Peradeniya is pale yellow, effused, thin, even, 50-100 μ, thick, closely studded with circular holes, 0·1-0·3 mm. diameter, sometimes confluent in short branching lines, which appear to expose the substratum. In some of these holes there is a minute white mass in the centre, united to the sides by fine, radial strands. At one side of the specimen the margin is chiefly

white and byssoid. At the other side there are waxy, pale ochraceous patches, which bear minute, paler, circular areas ; and on examination under a low magnification it is seen that on these pale spots the surface layer is raised and cracked, and finally recurves, forming a crater-like cavity. These are the first stages of formation of the holes in the stroma. When fully formed, the margins of the holes are smooth and do not indicate the mode of origin.

The context is composed of loosely interwoven, hyaline hyphae, enclosing large numbers of granules of calcium oxalate, and has a thin, pale yellow, surface layer about 12 μ thick. It contains numerous cavities, which extend almost from the base to the upper layer of the fructification, and are filled with granules of calcium oxalate. The upper layer overlying a cavity breaks up and disappears ; and the granules fall out, leaving a hole which descends almost to the base of the stroma. In some cases, a small mass of granules, bound together by hyphae, persists in the centre of the cavity. Basidia have not been observed in this specimen.

In Fungi of Ceylon, No. 559, Berkeley and Broome described *Grandinia papulosa* B. & Br., as " Effusa, ochroleuca, margine angustissimo vel obsoleto ; hymenio glabro papulis obtusis depressis, interstitiis laevibus. Spreading for some inches. Hymenium sprinkled with scattered depressed granules."

There are three pieces of this in Thwaites 995 in Herb. Peradeniya, bearing examples of the fungus which differ in thickness. The smallest and youngest patch, only about 2 cms. long, is exactly the same as the Peradeniya specimen of *Kneiffia Muelleri*. Another thicker piece, up to 0·15 mm. thick, is covered with scattered minute elevations and small white masses ; this again has the same structure as the specimen of *Kneiffia Muelleri*, the white masses of granules descending almost to the base, and the minute elevations being points where the upper layer has not broken away. The third and largest piece evidently extended for several inches ; it is cream-coloured (?) without a differentiated margin, or with a narrow, brown, glabrous margin, and covered with flattened-pulvinate, white masses, up to 0·4 mm. diameter ; it is up to 0·5 mm. thick, stratose, the old hymenia appearing as pale yellow and translucent zones in thick sections ; the structure is that of " *Kneiffia Muelleri*," the masses of granules descending almost to the base of the stroma. In the thicker stromata, the granules have not fallen out.

Berkeley and Broome stated that the granules were depressed. The masses are more or less flat-topped, and tend to spread out in lobes over the surrounding hymenium. In some instances, the part of the superficial layer which originally covered one persists as a minute brown cap.

The thicker fructifications have minute, hyaline, rough cystidia, obtuse, cylindrical above, suddenly attenuated below, 12-14 μ long, 5-6 μ diameter, projecting 8-20 μ, and only slightly embedded. The basidia are clavate, 4 μ diameter, with slender sterigmata 2 μ long. Cystidia have not been found in the young, thin examples.

The masses of granules which appear as white spots on the hymenium are similar to those of *Kneiffia coriacea*. They would not appear to constitute a generic character. *Grandinia papulosa* is identical with the Ceylon specimen of *Kneiffia Muelleri*, and is a *Peniophora*. The Australian type specimen of *Kneiffia Muelleri* has not been examined, and hence it is not yet possible to make any statement regarding it, or to settle the name of the Ceylon species. From Berkeley's description the Australian fungus would appear to be different.

296.—Kneiffia setigera Fr.

Berkeley and Broome recorded this species for Ceylon from Thwaites 654. There are two different species in Thwaites 654 in Herb. Peradeniya, but neither bears *Peniophora* setae, and consequently neither is *Peniophora setigera* (Fr.) Bres.

297.—Grandinia granulosa Fr. var. candida

Berkeley and Broome recorded this in Fungi of Ceylon, No. 560, from Thwaites 327, without description. Thwaites, in Herb. Peradeniya, placed his 326 and 327 on the same sheet. Berkeley and Broome apparently did not describe Thwaites 326. The mixture contains three species, two of which might be styled candida, while the third is subtranslucent. The first two have *Peniophora* setae ; the third has long, slender, hyaline setae, united laterally into compact columns, up to 120 μ high and 30 μ diameter. None of these is *Grandinia granulosa* Fr.

298.—Grandinia lateritia B. & Br.

This was described in Fungi of Ceylon, No. 561, as " Effusa, lateritia, farinacea, granulis distinctis ; margine, si adsit, pallidiore tomentoso. Very much the colour of *Kneiffia fulva* B. & C., a Cuban species ; but the hymenium is very different."

The specimen, Thwaites 334, in Herb. Peradeniya, is effused, red-brown, pruinose, covered with minute more or less conical projections, soft, and with a byssoid margin. It is up to 0·3 mm. thick, loose and spongy internally, very loose at the base, hyaline below, becoming red-brown above. The hyphae are pale red-brown in mass, almost hyaline individually ; at the base of the fructification they are 2-3 μ

diameter, regular ; in the upper part they are more slender, down to 1 μ diameter. All the hyphae are more or less encrusted with minute globose masses of calcium oxalate. The conical projections are up to 150 μ high, and 200 μ diameter at the base ; they are composed of rather loosely interwoven hyphae, and are covered by the hymenium except at the apex. A narrow column, denser than the intervening part of the fructification, traverses it, vertically, beneath each projection, but is not composed of vertical parallel hyphae. The basidia are clavate, 12 μ high, 6 μ diameter, with short sterigmata. The spores are pale yellow-brown, spinulose, globose, 4-5 μ diameter, or oval, up to 8×6 μ.

This species is a *Tomentella*. As it has projections on the hymenium it might be placed in *Caldesiella*, but the projections are scarcely sufficiently marked for that genus. *Tomentella lateritia* being already occupied, it may be known as *Tomentella rufobrunnea* nom. nov.

299.—Merulius versiformis B. & Br.

Berkeley and Broome described this species from Thwaites 660 as " Tenuis, primum pulverulentus graniferus ex ochraceo rufus, demum gelatinosus ; hymenio vix poriforme. At first forming a thin ochraceous pulverulent stratum, which is scattered with granules after the fashion of a *Grandinia* ; but the hymenium gradually changes colour, and becomes of a gelatinous texture, with raised irregular processes, which hardly form pores."

In Thwaites 660 in Herb. Peradeniya, there are three species, one on bark of a dicotyledon, a second on *Oncosperma* (?), and the third chiefly on fragments of wood. I have not examined the type in Herb. Kew, but it would seem probable that a similar mixture occurs in it, as Berkeley and Broome's description appears to refer to at least two of the three species.

The specimens on fragments of wood are ultimately gelatinous and furnished with distinct processes ; consequently these may be taken as *Merulius versiformis*. The fungus begins as a thin byssoid layer, on which minute, red-brown, translucent, slightly pulvinate masses develop. Ultimately a continuous, red-brown, thin, gelatinous layer is formed, from which arise minute scattered processes. The gelatinous layer is up to 60 μ thick, translucent, and composed of fused hyphae more or less parallel to the substratum. The processes are similarly translucent, conical or subcylindric, projecting about 50 μ ; they arise from the base of the stroma and are composed of parallel hyphae. No basidia have been observed. The specimen is immature, and might be a *Heterochaete* or an *Odontia*. It is surely not a *Merulius*, and Berkeley and Broome's name should be discarded. The descriptions of the other

two species in Thwaites 660 are as follows, the colours being those of the herbarium specimens.

Peniophora (*Scopuloides*) *ceracea* Petch, n. sp. Effused, dull orange red in the centre, passing into ochraceous, then yellow, outwards, with a narrow, byssoid or pulverulent, white margin, waxy, slightly pruinose ; up to 0·1 mm. thick, the lower half composed of loosely interwoven, irregular hyphae, enclosing numerous masses of calcium oxalate, the upper half yellow, compact, subtranslucent ; cystidia hyaline, cylindric, obtuse, encrusted, 36-50 μ high (probably longer), 8-10 μ diameter, projecting up to 30 μ, fasciculate in groups up to 60 μ diameter ; basidia cylindric, 12 μ long, 3 μ diameter ; spores oval, spinulose, 4 × 3 μ. On bark, Central Province, Ceylon ; Thwaites 660 in part.

Peniophora fracta Petch, n. sp. Effused, ochraceous (?), uneven, cracking into small areolae when dry, pruinose ; up to 0·2 mm. thick, internally stratose, yellow-brown with red-brown zones below, pale yellow above; tissue loose, of stout irregular hyphae and irregular yellow-brown translucent masses of fused hyphae and cystidia ; basal layer of yellow-brown hyphae parallel to the substratum ; cystidia hyaline, encrusted, cylindric, obtuse, up to 80 μ high, 8 μ diameter, projecting 25 to 45 μ, scattered on the surface, but crowded in the buried zones. On *Oncosperma* (?), Central Province, Ceylon ; Thwaites 660 in part.

300.—Clavaria chlorina B. & Br.

This was described in Fungi of Ceylon, No. 680, as " Simplex vel subramosa rugosa viridis, stipite tenui (No. 200). On the ground amongst leaves, Nov. 1867. Sometimes forked or proliferous. Spores ·00015 long, setulose. "

The specimens are up to 5 cm. high, simple, or with a short lateral branch near the base, 1 mm. diameter below, elongated fusiform or clavate, expanding to 2 mm. diameter above, laterally compressed (? only in drying), pruinose below, waxy above, apex obtuse. In section, the clava shows a central, horny and subtranslucent core, surrounded by a loose plectenchymatous tissue, 30-60 μ broad. The hyphae are chiefly thin-walled, but both in the central core and the looser peripheral layer, there are scattered, solid hyphae, 4 μ diameter, which stain deep yellow-brown with iodine. At the exterior, the plectenchymatous tissue forms a continous layer of cells about 4 μ diameter and 6 μ deep, and from each of these there arises a cluster of elongated flask-shaped phialides, about 15 μ long, 2 μ diameter below, tapering to the apex. The phialides form a yellow palisade layer, which contrasts strongly with the hyaline looser tissue below it. The clava bears a dense layer of spores, which are pale

yellow, faintly warted, oval, 2-3 × 1·5-2 μ. Berkeley and Broome's " setulose " was probably a misprint for spinulose.

This fungus is evidently not a *Clavaria*. It is a conidial species, but not the conidial stage of a *Penicillopsis*. Its true position is doubtful.

301.—Lycoperdon fucatum Lév.

The list of Ceylon fungi sent by Gardner (Decades of Fungi, XV-XIX, Hooker's Lond. Jour. Bot., VI, pp. 479-514), Berkeley recorded *Lycoperdon fucatum* Lév., Gardner No. 16.

In the cover of *Lycoperdon fucatum* in Herb. Kew, there are two Ceylon gatherings. One marked " Ceylon, Gardner " consists of four parts of specimens ; it is immature, but appears to be *Sarcoxylon aurantiacum*. The other contains one specimen, marked "16, on old trees, Hantane, June 44" by Gardner, and "*Lycop. fucatum* Lév." by Berkeley. This latter specimen is *Lasiosphaera Fenzlii* Reichardt. The statement that it grew on trees is probably an error, as all specimens recently collected have grown on the ground. Massee, Mon. Genus Lycoperdon, (Jour. Roy. Microscopical Soc., 1887, pp. 701-727) recorded *Lycoperdon fucatum* for Ceylon, and stated that it grew " on the ground and on old trees, " the latter habitat probably having been taken from the herbarium sheet of the Ceylon specimen.

302.—Lycoperdon rugosum B. & C.

This species was recorded for Ceylon in Berkeley and Curtis, Cuban Fungi, No. 504, and the record was repeated by Massee in Mon. Genus Lycoperdon (*loc. cit.*). There is no Ceylon specimen of *Lycoperdon rugosum* in the cover in Herb. Kew.

303.—Sclerotium (Mylitta) ligulatum Ces.

Cesati, in his account of the fungi collected in Ceylon and Borneo by Beccari, described *Sclerotium ligulatum*, which was found on Pedrotalagalla, Ceylon. It was " Olivaceum, difforme, cylindraceum v. compressiusculum, pistillare vel turbinatum, passim bifidum, carnosum, intus album, contextu e vesiculoso granulari ". What is believed to be the same species was collected in a cave on Pedrotalagalla in 1904. and has been found common in certain fields on an up-country tea estate,

The sclerotia are irregularly ovoid or subglobose, usually with a more or less undulating surface, and of the same variability in size and shape as a potato. The largest specimen seen measures 6 × 4·5 × 4 cm. The colour is brown, or blackish-brown, externally, and the surface is rough and divided into more or less polygonal areolae, separated by shallow

furrows. Internally the sclerotium is very hard, and consists of translucent masses separated by white veins. It is evidently a *Mylitta*.

Berkeley, Currey, and Hanbury in Trans, Linn. Soc., XXIII (1860), pp. 91-96, described a similar sclerotium from India. Berkeley stated that its structure was very like that of *Mylitta australis*, and, though there was a slight difference in the outer coat, it was probably the same as the *Mylitta* of China, *Mylitta lapidescens* Horaninow. Currey and Hanbury agreed that the Chinese and Indian species were the same. Butler (Fungi and Disease in Plants, p. 13) states that *Mylitta lapidescens* occurs in the Nilgiris, where it is known as " Little man's bread. "

It is most probable that the *Mylitta* from South India is identical with that of Ceylon, though, of course, it is impossible to make any correct statement until the fructification has been found in each case. In Ceylon, the only basidiomycetous fungus known to grow from a true sclerotium is *Fomes rhinocerotis* Cooke, but that has been found only in the low-country, while *Sclerotium ligulatum* is known only from above 3000 feet, Pedrotalagalla being the highest point in the Island. But, in the absence of fructifications, the name *Mylitta ligulata* should be employed for the Ceylon species, rather than *Mylitta lapidescens*, as the type locality of the latter is China, not India, and consequently it is most probable that the two sclerotia belong to different species of fungi.

One correspondent informed me several years ago that in the Nuwara Eliya district (Pedrotalagalla) these sclerotia are cooked and eaten, but I have not been able to obtain confirmation of that. They are known by the Sinhalese name, Sita aggala, and by the Tamil name, Ravanon kolai koddai, from which it would appear that they are more widely distributed than our records show. Both these names have reference to the following well-known incident in the legendary history of Ceylon.

Sita, the wife of Rama, King of India, was abducted by Ravana and carried off to the jungles of Ceylon. There she fasted forty days, and during that period, being desirous of making certain offerings, asked for fruits, etc., to be supplied. Ravana, however, sent her cooked rice, whereupon, she, considering that an attempt to induce her to break her fast, made the rice into balls and threw it away, at the same time invoking curses on Ravana and all his family. Sita aggala means Sita's cakes, while Ravanon kolai koddai may be translated as the fatal gift of Ravana.

304.—Nectria stenospora B. & Br.

This species was discussed in Hypocreaceae Zeylanicae (Ann. Perad , VII, p. 104). It was described by Berkeley and Broome in Fungi of Ceylon, No. 1011, as " Caespitosa e matrice alba oriunda ; peritheciis minutis pellucido-coccineis collapsis ; sporis angustis uniseptatis. On

soft decaying stems. South of the Island, July 1868. Sporidia 10-12·5 μ long, 2·5-3·75 μ wide."

The specimen was part of Thwaites 647, a number which provided *Nectria stenospora*, *Nectria trichospora*, *Nectria sanguinea*, *Nectria bicolor*, *Nectria Bambusae*, and *Nectria pityrodes* var. *saccharina*.

The supposed type specimen in Herb. Kew has been examined by von Höhnel, who found that it contained five species, *viz. Nectria stenospora*, *Nectria bicolor*, *Nectria luteococcinea* (=*N. haematococca* B. & Br.) *Calonectria sulcata* (=*Calonectria rigidiuscula* B. & Br.), and *Nectria flocculenta* (=*Nectria flavolanata* B. & Br.). von Höhnel stated that *Nectria stenospora* occurred sparingly on the type specimen ; it was apparently so scanty that there are now no specimens left. von Höhnel indicated on the herbarium sheet the position of the last four species, but he did not mark *Nectria stenospora*.

The species which von Höhnel took as *Nectria stenospora*, according to his description (Mitt. XIV, p. 31) has perithecia situated in small groups on a feebly developed, erumpent stroma ; they are cinnabar-red, globose, not collapsing, smooth, 250-280 μ diameter, with a small, flat, ostiolar papilla. The asci are clavate, with biseriate spores, 50-60 ×9-10 μ. The spores are straight, elongated-elliptic, with obtuse ends, not constricted at the septum, hyaline, with four or five longitudinal striae, 10-14 × 4-5 μ.

As previously pointed out (*loc. cit.*) von Höhnel's description differs from Berkeley and Broome's in several details. The latter state that perithecia arise from a white stroma, are pellucid red, and collapse ; von Höhnel does not refer to a white stroma, does not describe the perithecia as translucent, and states that they do not collapse. Because of these discrepancies, it was suggested, in dealing with this species in Hypocreaceae Zeylanicae, that the name should be applied, not to von Höhnel's species, but to another which formed part of Thwaites 647 and is otherwise unrecorded.

However, on consulting the Herbarium of the British Museum (Natural History), it was found that that Herbarium possessed an ample specimen of *Nectria stenospora*, *ex* Herb. Broome, which answers completely to the macroscopic characters of the original description. Under this name in Herb. B. M. are two sheets *ex* Herb. Broome. One of them is Ceylon 647 ; the fungus is on dead herbaceous stems, and it appears to be all the same species ; it is accompanied by a drawing, and a spore measurement "0. 0004-0·0005 l., 0·0001—0·00021 w." This is undoubtedly *Nectria stenospora* B. & Br. The other specimen is marked 647 bis ; it is a mixture, and contains the species which I suggested in Ann. Perad., VII, p. 106 was *Nectria stenospora*.

In Thwaites 647, *Nectria stenospora*, in Herb. B. M., the perithecia are in small groups, either without a visible stroma, or situated round a yellowish white tuft of hyphae. The perithecia collapse centrally; they are either pale ochraceous and almost opaque, or dark brownish red and subtranslucent, both colours occurring in the same group. The perithecia are globose, with a minute, conical ostiolum, 0·2-0·25 mm. diameter, at first pruinose, becoming almost glabrous, rugose; when mounted, the perithecial wall is pale yellow. The asci are clavate, eight-spored, with spores biseriate above and uniseriate below, 50 × 8 μ. The spores are narrow-oval, ends obtuse, not, or slightly, constricted, one-septate, hyaline, minutely verrucose, 10-14 × 4-5 μ.

There is not much doubt that this is the real *Nectria stenospora* of Berkeley and Broome. But it is also quite evidently *Nectria bicolor* B. & Br. von Höhnel did not describe *Nectria bicolor*, but stated that it was scarcely different from *Nectria ochroleuca*. Berkeley and Broome's description of *Nectria bicolor* does not differ much from that of *Nectria stenospora*, and it would appear that they gave the former name to specimens which lacked the white matrix. The spores of *Nectria bicolor* were given as 8·75 μ long and 2·5 μ broad.

Nectria bicolor B. & Br. is consequently a synonym of *Nectria stenospora* B. & Br.

In one recent gathering of *Nectria stenospora*, the ascospores are 8-10 × 3 μ, rarely 4 μ broad. The conidial stromata are pulvinate, rather loosely-built, pink, sometimes with a white byssoid margin; the conidiophores are short and branched, and the conidia are narrow oval, 4-11 × 1·5-3 μ.

The remaining *Nectria* of Thwaites 647, which occurs in Herb. Kew in the cover of *Nectria bicolor* and in the cover of *Nectria sanguinea*, is apparently undescribed. It may be known as *Nectria flavistroma*.

Nectria flavistroma n. sp. Perithecia densely crowded on an erumpent stroma in pulvinate masses up to 5 mm. diameter. Stroma parenchymatous, composed of small thick-walled cells, or somewhat sclerotioid, orange-red above, yellow internally, paler towards the base. Perithecia bright red, becoming dark red, subtranslucent, glabrous, ovoid or suburceolate, 0·15-0·25 mm. diameter; ostiolum broadly conical, darker than the perithecial wall, ochraceous at the apex; perithecial wall, in section, yellow internally, red towards the exterior, composed of thick-walled cells 8 μ diameter, the outer layer somewhat amorphous. Asci sessile, narrow-clavate, 50-65 × 6-9 μ, eight-spored, spores obliquely uniseriate. Paraphyses linear. Spores hyaline, oval, obtuse, not constricted, one-septate, 10-13 × 4-7 μ.

Parasitic on Sphaeriaceae, Ceylon: Thwaites 647 in part.

305.—**Nectria villigera** B. & Br.

Berkeley and Broome described this species in Fungi of Ceylon, No. 1012 (Jour. Linn. Soc., XIV, p. 115) as " Conglomerata : peritheciis ovatis rugosis pallidis : floccis conidiiferis conidiis longiseptatis magnis ellipticis vel obovatis (No. 156). Apparently on some decaying fungus. Nov. 1867. Surface of perithecia rough. "

I was unable to find the type specimen of *Nectria villigera* in Herb. Kew, or Herb. British Museum in 1915, and consequently this species could not be redescribed in " Hypocreaceae Zeylanicae ", Ann. Perad., VII, pp. 85-138. In 1920, during an examination of the Kew specimens of *Nectria* for scale insect parasites, the type of *Nectria villigera* was discovered.

The specimen answers to Berkeley and Broome's description. It consists of subglobose or ellipsoid bodies, heaped together in loosely caespitose masses. The individual " perithecia " are rough, subtranslucent or opaque, pale yellow, dark amber, dark orange, or dark red brown, 0·2-0·25 mm. diameter. They are bound together by scanty hyaline mycelium, and sometimes bear scattered, erect, hyaline hyphae.

Examination shows that these are masses of insect frass, bound together by mycelium. The mycelium is probably that of a *Fusarium*. I was able to obtain only small, non-septate, hyaline conidia.

The name *Nectria villigera* is consequently to be discarded.

306.—**Sphaerostilbe lateritia** B. & C.

This species was recorded for Ceylon by Berkeley, in Fungi Cubenses, Jour. Linn. Soc , X (1869), p. 377. There is no Ceylon specimen in the herbaria of the British Museum and Kew, but in the latter there is a specimen collected by Gardner in Brazil in 1841, which may be the one Berkeley had in mind, as Gardner subsequently came to Ceylon and the name of the locality on the specimen, Maranham, resembles a Ceylon name.

307.—**Hypocrea multiformis** B. & Br.

For this species, Berkeley and Broome cited the Thwaites' numbers, 1094, 1095, 1096, 33 in part, in Fungi of Ceylon, No. 995. 1096 is 33 in part, while 1094 and 1095 are parts of Thwaites 5. This species was discussed in Ann. Perad., VII, p. 96, where it was pointed out Berkeley and Broome cited 5 in part, 1094, for *Hypocrea citrina* var., and 5 in part for *Hypocrea albofulva* B. & Br., *Hypocrea discella* B. & Br., and *Hypocrea catoptron* B. & Br., and that the herbarium specimens were mixtures. In conclusion, it was stated " It may be that there is another

species in Thwaites 1094 in Herb. Kew or Herb. British Museum, to which the name *Hypocrea multiformis* might be applied, but in view of the mixture cited by Berkeley and Broome it would seem preferable to discard the name."

Since then the specimens in Herb. Kew and Herb. British Museum have been re-examined. Confining attention to Thwaites 1094, it has been found that in both herbaria there are two sets of specimens under that number. In Herb. Kew, each set of specimens contains two species, part being marked *Hypocrea multiformis* and part *Hypocrea citrina* var. In Herb. British Museum, there is apparently only one species in the two specimens marked *Hypocrea multiformis*. The *Hypocrea multiformis* of these specimens proves to be distinct from those previously examined, and if the name be restricted to Thwaites 1094 in Herb. B. M., and the part of 1094 so labelled in Herb. Kew, it will stand as a valid species. It is near *Hypocrea citrina* var. (=*Hypocrea straminea*) in some respects, but apparently sufficiently distinct. It has not been matched by any recent gathering.

Berkeley and Broome's description probably refers to more than one species. The specimens are not "umbrinella," and the perithecia are not prominent.

The stromata are discoid, up to 1·5 mm. diameter and 0·6 mm. thick, with a rounded margin, attached over a central area the diameter of which is about one third that of the base, but not contracted below. The surface is slightly irregularly wrinkled and tuberculate, and the margin incised. The stromata are ochraceous, with dark brown ostiola, which are punctiform and almost black when the perithecia are immature; they appear opaque, but the internal tissue is subtranslucent in section. The perithecia are crowded in a single peripheral layer, the tissue between the bases of the perithecia being yellow; they are globose, 0·15-0·2 mm. diameter, or laterally oval, 0·25 × 0·15 mm., with a yellow wall. The asci are about 60 μ long and 3 μ diameter. The part-spores are not quite mature; they are greenish hyaline, almost smooth, globose, 3 μ diameter, or cuboid, 4 × 3 μ.

308.—**Botryosphaeria catervaria** (B. & C.) Sacc.

In Saccardo, Sylloge, I, p. 462, there is listed "*Botryosphaeria catervaria* (B. & C.) Sacc., *Diatrype catervaria* B. & C. in N. Pac. expl., p. 128, n. 156,—Stromatibus parvis in maculis aggregatis, papilla centrali notatis, quandoque confluentibus; ascis brevibus; sporidiis globosis. Hab. in foliis *Fici*, Hongkong, Ceylon."

In Annales Mycologici, XIV, p. 329, Theissen remarked that "Stromata die mit einer gemeinsam Zentralpapille versehen sind, konnen

nicht einer *Botryosphaeria* angehoren ; auch kugelige Sporen sind der Gattung fremd. "

Diatrype catervaria was not included by Berkeley and Broome in the Fungi of Ceylon. As far as the Ceylon reference is concerned, this is probably the specimen on *Ficus oppositifolia* (*Ficus hispida* L. f.), collected by Thwaites, Oct. 12, 1850, and recorded by Berkeley in Hooker's Journal of Botany, 1854, p. 231, as *Dothidea repens* (Corda) var. *catervaria*. It now stands as *Phyllachora catervaria* (Berk.) Sacc.

309.—**Botryosphaeria inflata** Cke. & Massee.

This species was re-described in Ann. Perad., VII, p. 26. Cooke and Massee found, on the type specimen, *Nectriella gigaspora* Cke. & Mass. The latter was re-described in Ann. Perad., VII, p. 122, as *Pseudonectria gigaspora*. von Höhnel, in discussing *Botryosphaeria xanthocephala* (Syd. & Butl.) Theiss., which has a black stroma with yellow beaks, suggested that *Botryosphaeria inflata* is identical with the latter, Cooke and Massee having mistaken the yellow beaks for *Nectriella* perithecia (Fragmente zur Mykologie, XXIV, p. 7). *Botryosphaeria inflata*, however, does not possess yellow beaks, and *Nectriella gigaspora* is a distinct species, which is parasitic on Sphaeriaceae, etc.

310.—**Micropeltella Thwaitesii** Petch.

In Annals Peradeniya, VII, page 34, it was shown that the specimen from Ceylon, listed by Berkeley and Broome as *Micropeltis applanata* Mont., was not that species. It had two-septate spores, and had no paraphyses. The name *Micropeltella Thwaitesii* was adopted for it, with the suggestion that Sydow's genus *Micropeltella*, as limited by Theissen, should be enlarged to include species with spores two-septate.

Specimens of this fungus have recently been collected on *Aporosa lanceolata* Thw., and with the help of these the former description can be extended. The perithecia occur on the upper side of the leaf ; they are scattered, black, scutate, circular, slightly radially rugose, about 0·5 mm. diameter, with the centre elevated and somewhat columnar. The cover is netted, not radial, opaque in the centre, becoming hyaline at the margin ; in Berkeley and Broome's specimens there is a distinct blue-green tinge at the edge of the cover, but this is not evident in the more mature recent examples. There is no trace in the latter of the layer of crystals noted in the former. The asci are clavate, sessile, eight-spored, 55 × 12 μ. The spores are greenish hyaline, fusoid, straight or curved, five-septate, constricted at the septa, ends rounded, the upper cell usually the larger, 20-25 × 6 μ. On re-examination, similar spores have been found in Berkeley and Broome's specimen.

There is consequently no need to extend the genus *Micropeltella* in order to include this species.

311.—Phoma pelliculosum B. & Br.

Berkeley and Broome described this species in Fungi of Ceylon, No. 801, as " Griseum, e matrice secernibile ; peritheciis minutissimis epidermidem elevantibus ostiolo amplo ; sporis angustis, quam sporophoribus triplo brevioribus (No. 438). On bamboo, Peradeniya, December 1867. Peeling off in little ragged shreds : spores ·0001 long. "

The bamboo bears a very thin, grey or greenish film, in which the pycnidia are embedded. The latter are scattered, black, up to 0·15 mm. diameter, flattened-convex, ostiolate, at first covered by the film, and ultimately breaking through it. The base of the pycnidium is flat and hyaline, and rests on the bamboo. The upper wall is black, opaque, fragile, with a fimbriate lower edge which shows a radial hyphal structure at the extreme margin : it forms a shield-like cover to the pycnidium. The ostiolum becomes widely open, the cover breaking away so that only a ring remains. A few fuscous hyphae, 2-4 μ diameter, run over or in the film.

The grey film can be peeled off the substratum, and it brings away with it the whole of the pycnidia, no evident trace of them being left on the bamboo. In the type specimen, the broken pycnidia then appear as rings up to 50 μ broad, with a hyaline inner ring of spores and basidia, surrounding a central hole.

The spores are minute, hyaline, oblong-oval, 3-5 × 1-1·5 μ, with many globose, 1 μ diameter. The basidia are short and simple, about 6 μ long, with a few long paraphyses, up to 50 μ long.

In Kew Bulletin, 1921, p. 150, Grove transferred this species to *Eriothyrium* Speg., at the same time amending the generic description of the latter. *Eriothyrium*, as amended by Grove, includes species which have scutato-dimidiate pycnidia, which are adnate, ostiolate, surrounded by an effused, very thin, smoky or fuscous-pallid subiculum, and have hyaline, continous spores.

Grove's description states that the pycnidia are black, 50-100 μ diameter, crowded, round, shield-shaped, dimidiate, applanato-convex, pierced by a wide, central, round or irregularly impressed pore ; texture of dark-brown cells, about 2-3 μ diameter, distinctly radiating especially at the margin ; spores narrow-oblong, straight or curvulous, about 3 × 1 μ ; sporophores rod-shaped, up to three times as long, springing from the underside of the shield.

Grove describes the fungus as occurring under the cuticle of bamboo stems. " The mycelium appears to arise in the epidermal cells, which

it ultimately destroys, leaving a layer of hyphae lying on the sclerenchymatous zone which underlies the epidermis and separating easily therefrom." "The pycnidia are immersed in, and at first covered by, a thin membranous subiculum, which appears to be composed of densely interwoven, pallid hyphae, adherent to the cuticle ; at length the vertex of each shield emerges from the weft, splitting the cuticle and opening by a pore which gradually grows wider ; ultimately the shield falls away entirely, leaving a little pit. The cells of the subiculum are thin-walled, very indistinct and tightly packed, forming a pseudoparenchyma, but occasionally the course of the separate radiating hyphae can be discerned."

In the specimens in Herb. Peradeniya, no radial structure is evident in the shield except at the margin. Otherwise Grove's re-description agrees with Ceylon observations, with the following exception. The film in which the pycnidia are embedded is quite superficial. It is composed of irregular hyphae, 1-2 μ diameter, thick-walled or almost solid, with a narrow interrupted lumen. These hyphae form a network in the thinner parts, but become more interwoven and denser in the older parts, and are intermingled with alga cells. When fresh the film is green at first, becoming greyish green later. It is particularly conspicuous on the stems of the yellow bamboo, the natural surface of which is glabrous.

There does not appear to be any doubt that the superficial film is a lichen thallus, and that the fungus is parasitic on the lichen, not on the bamboo. As the film is not the mycelium of the fungus, the latter cannot be assigned to *Eriothyrium*. It would appear to be *Actinothecium*, and may stand as *Actinothecium pelliculosum*.

312.—**Phoma coryphae** Cooke & Massee.

The description of this species was published in Grevillea, XIX, p. 75, in an unsigned article entitled "Omitted Diagnoses", which professed to contain descriptions which had been omitted from Saccardo's Sylloge. Some of these descriptions, however, including the one under notice, had never been previously published, and consequently no blame could attach to Saccardo for the alleged omission.

Phoma coryphae was described as "Peritheciis laxe gregariis erumpentibus, conicis, basi insculptis, atris, papillatis (0·5-0·3 mm). Sporulis arcte ellipticis, utrinque rotundatis, hyalinis, 12 × 3 μ. On palm petioles. Ceylon, 649."

The type specimen in Herb. Kew bears a label with the inscription by Thwaites "No. 649, S. of the Island, July 1868." Thwaites 649 was *Sphaeria agnocystis*, and the type of the latter bears another Thwaites's label with the same inscription, and in addition the words "compare

with 268." There is also, under *Sphaeria agnocystis*, another piece labelled "Ceylon, 649," *ex* Herb. Currey (?), which is the same as *Phoma coryphae*.

Cooke and Massee wrote the specific name without a capital. It is doubtful, therefore, whether they believed the host plant to be *Corypha*. If they did, it is not clear whence they derived that information. The host is a bamboo.

The surface of the host plant is covered by a thin greenish-grey layer with a black margin running transversely across the stem. This is a lichen. Over the surface of the lichen run widely-separated, dark-brown hyphae, 2-4 μ diameter. The pycnidia are seated on the exterior of the bamboo, and break through the lichen covering. They are up to 0·3 mm. diameter, and 0·3 mm. high, black, conical, with an even or papillate ostiolum. The wall is brittle, carbonaceous and opaque except at the extreme margin. The base is flat, black, except in the centre, where there is a subtranslucent circular area about 12 μ diameter. On peeling off the lichen, the pycnidia are detached with it, except for a narrow, irregular, interrupted ring derived from the margin of the pycnidium. This ring consists of irregularly fused, more or less radial, dark brown hyphae, 2-3 μ diameter. The base of the pycnidium is not immersed in the tissues of the bamboo.

The spores are hyaline, cylindric or oblong oval, 3-5 × 1·5-2 μ. They are borne on short, simple basidia, up to 8 μ long, with which are intermingled a few long hyaline paraphyses, up to 50 μ long, 1 μ diameter. The pycnidium contains quantities of calcium oxalate in large irregular masses, up to 32 × 20 μ.

This species is similar in structure to *Phoma pelliculosum*. Like the latter, it is parasitic on a lichen, and it has exactly the same spores and paraphyses. It differs from *Phoma pelliculosum* in its larger pycnidia, and in leaving a ring, the margin of the pycnidium, attached to the host plant when the lichen film is peeled off. The latter may be a consequence of the greater development of the pycnidia. The differences do not appear to warrant the separation of *Phoma coryphae* from *Phoma pelliculosum*.

313.—**Phoma Lobeliae** B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 802, as "Pustulis epidermide alba tectis, demum emersis; sporis ellipticis (No. 301). On *Lobelia nicotianaefolia*, Nuwara Eliya. Spores ·00015 long."

No fungus answering to this description could be found in the co-type in Herb. Peradeniya, and consequently in a previous communication it was suggested that the species was a *Phomopsis* which occurs

on the same host at Nuwara Eliya. An examination of the type in Herb. Kew has, however, shown that that is incorrect.

Lobelia nicotianaefolia has flowering stems up to about four feet in height and an inch and a half in diameter. These are a prominent feature in the landscape at Nuwara Eliya, both during and after flowering. The stems are woody, and they take several months to decay. Consequently the erect dead stems persist for a long time. The type specimen of *Phoma Lobeliae* is on a piece of a decaying stem ; it consists of part of the woody cylinder, covered chiefly by the persistent membranous epidermis. Berkeley and Broome's " epidermide alba " refers to the spots where nothing but the bleached epidermis overlies the wood.

The pycnidia are superficial on the wood, either scattered or in small groups, with the ostiola just penetrating the epidermis. When the dead epidermis is removed, the pycnidia can be lifted off the wood with a needle. They are about 0·3 mm. diameter, globose or flattened globose, with a small conical ostiolum, black, not carbonaceous. When mounted, the wall is membranous, dark brown, black round the ostiolum, the outer layer somewhat amorphous and bearing a few adherent dark-brown hyphae, 3 μ diameter. The spores are brown in mass, yellow-brown to almost hyaline when viewed separately, smooth, oval, 3·5-5 ×2-2·5 μ or globose, 3 μ diameter.

This is apparently *Coniothyrium*, and will stand as *Coniothyrium Lobeliae* (B. & Br.). But it would appear probable that the fungus is merely saprophytic, and is not peculiar to *Lobelia*.

314.—**Phoma hysterioideum** B. & Br.

Berkeley and Broome described this species in Fungi of Ceylon, No. 803, as " Ellipticum, nigrum, epidermide cinctum, opacum ; sporis oblongis minimis (No. 509). Possibly a state of *Dothidea graminis.* " In Herb. Peradeniya, Thwaites 509 and 733, on *Panicum fluitans* are included under *Dothidea graminis.* Berkeley and Broome cited Thwaites 733 for the latter species, but not Thwaites 509. There is no specimen under the name *Phoma hysterioideum* in Herb. Kew, but Herb. British Museum has a specimen *ex* Herb. Broome, labelled by Thwaites " 509, *Phoma* on *Panicum fluitans,* " with a drawing by Broome which shows an ascus and spores.

The stromata appear as black, slightly elevated, oval spots, up to 0·6 mm. long and 0·35 mm. broad, scattered over the upper surface of the leaf : they are not evident from the lower surface. The stroma is about 0·2 mm. thick, covered by the cuticle, or the outer wall of the epidermal cells of the host, and extending in the mesophyll down to the

vascular bundles. The wall is black and dothideoid at the sides and over the top, with a thin, brownish basal layer. The sides expand towards the base, and may attain a thickness of 50 μ there. Only one loculus, laterally oval, is seen in transverse section, as a rule. In some cases, however, two loculi appear, but these are separated by a black wall, and most probably are cross sections of two confluent stromata. The loculi contain asci, which are clavate, 80 × 16 μ, or broadly clavate, 64 × 20 μ. The spores are hyaline, ellipsoidal, continuous, 10-14 × 6-8 μ. Numerous linear paraphyses are present.

In all the stromata examined, the loculi contain minute, hyaline, oval spores, 2-3 × 0·5-0·75μ, or less. These are situated above the mass of asci and paraphyses, and are probably derived from the latter. No case was observed in which the loculi contained these spores only; even when they were most numerous, well-developed paraphyses and immature asci were present.

Phoma hysterioideum, consequently, is a pycnidial stage of *Phyllachora graminis* (*sensu lato*), as suggested by Berkeley and Broome. But it is not, from the specimens examined, a true *Phoma*, nor a distinct form of the *Phyllachora*. It is merely a transitory stage in the development of the ascigerous loculus.

315.—Hendersonia Symploci B. & Br.

Berkeley and Broome's description of this species in Fungi of Ceylon, No. 794, is "Peritheciis nitidis, saepe circinantibus; sporis fusiformibus triseptatis (No. 592). On *Symplocos obtusa* Wall. Central Province, 5000 ft. Spores ·00012 long. No. 455 is a doubtful species of the same genus." In Herb. Peradeniya, Thwaites 592 is labelled Nuwara Eliya, and 455, Central Province.

There are two species in Thwaites 592, on leaves of *Symplocos obtusa*. One, the more numerous, has minute shining stromata, often arranged in circles, with no evident discoloration of the leaf. The other has rugose, dull black pycnidia on circular discoloured spots.

The latter fungus causes circular spots, purple-brown or black-brown, often concentrically zoned, slightly raised, about 1 mm. in diameter. In the middle of these spots there arises a single pycnidium, flattened globose, rugose, black, 0·5 mm. diameter, or a group of two or three globose pycnidia, about 0·25 mm. diameter. The pycnidia break through the surface of the spot, and become almost superficial, surrounded by the ruptured epidermis. Ostiola are not evident. The upper part of the wall of the pycnidium is thick and almost carbonaceous, and in sections it splits away in manner suggestive of the Leptostromataceae, but that does not appear to occur naturally. The spores are rather pale

brown, fusoid or cylindric, ends obtuse, three-septate, not constricted, collapsing, 22-32 × 4-6 μ. The basidia are short.

The second species is common at Hakgala on *Symplocos* spp., and has been collected on *Symplocos elegans*, *S. obtusa*, and *Symplocos latiflora*. The stroma are minute, up to 0·25 mm. diameter, subcuticular, broadly conical, with a flat base overlying the epidermal cells. They occur on either side of the leaf, frequently arranged in circles, and are black and shining, not erumpent, The upper layer, or cover, is black, opaque, up to 50 μ thick ; the basal layer is black and thin, 4-16 μ thick. The thin edge of the stroma is usually opaque, but it may extend laterally for some distance, underlying the cuticle and appearing from above as a sheet of laterally-united, radial hyphae. The thickness of the stroma in the centre is about 0·1 mm. Each stroma contains a single, laterally oval loculus, the space between the loculus and the margin of the stroma being filled with more or less vertically parallel, brown hyphae. The asci are thick-walled, clavate or subcylindric, 90 × 16 μ, eight-spored, spores biseriate. They are embedded in a tissue of thin, parallel, adherent, hyaline hyphae. The spores are brown, fusoid or oblong-oval, with obtuse ends, three-septate, sometimes scarcely constricted, sometimes sc strongly constricted at the median septum that they readily separate into two, 15–20 × 4–5 μ. The asci are soon diffluent, and in very many cases only the spores are found in the loculus.

Berkeley and Broome's description evidently includes both species. The spores described are, from their size, those of the pycnidial fungus, while the phrases, " Peritheciis nitidis, saepe circinantibus " refer to the ascigerous species.

Pending the full revision of the Sphaeropsidales, the first species may be left under Berkeley and Broome's name, *Hendersonia Symploci*. The second is a *Dermatodothis*. which has been named *Dermatodothis zeylanica* Syd.

Thwaites 455 is *Dermatodothis zeylanica*.

316.—**Hendersonia constricta** B. & Br.

Berkeley and Broome's description of this species in Fungi of Ceylon, No. 795, is " Peritheciis subglobosis pruinatis, basi floccis radiantibus suffultis; sporis metulaeformibus uniseptatis, medio constrictis (No. 351). On dead wood. Spores ·0009 long. " Saccardo, in listing it in Sylloge, III, p. 442, added " An Diplodiella ? an Staganospora ?". There is apparently no specimen in Herb. Kew. The type is in Herb. British Museum.

The wood is covered with a dense weft of dark brown, fairly regular, septate hyphae, forming a somewhat compact layer about 0·5 mm.

thick. The perithecia are embedded in this layer and are not visible to the naked eye. They are globose, 0·2 mm. diameter, or vertically oval, 0·3 mm. high, 0·2 mm. broad. The hyphae in which they are embedded arise both from the substratum and from the wall of the perithecium. The latter is thin and fragile, and consists of an outer brown layer of large cells,up to 16 μ broad, and an inner hyaline layer. The spores are pale fuliginous,narrow-oval or oblong-oval, ends rounded, one-septate, constricted at the septum, 16-26 × 6-8 μ. Most of them lie loose in the perithecium, but they are undoubtedly ascospores, and remains of the asci with included spores are present.

This species is *Neopeckia*, and will stand as *Neopeckia constricta* (B. & Br.).

317.—Sphaeropsis annularis B. & Br.

Myrosporium rufum B. & Br.

In Fungi of Ceylon, No. 792, Berkeley and Broome described *Sphaeropsis annularis* B. & Br., "Lateritia, peritheciis centro depressis; sporis subcuneiformibus (No. 114). On dead wood, Nov. 1867. Looks like a collapsed *Nectria*; spores ·0005 long." In Saccardo, III, p. 615, it was listed as *Zythia annularis* (B. & Br.).

In Fungi of Ceylon, No. 793, *Myrosporium rufum* was described It was "Placentaeforme, rufum, nitidum, collabens; sporis subellipticis (No. 1016). On petioles apparently of some palm. Peradeniya, Dec. 1868. Looks at first sight like a collapsed *Hypocrea*. About half a line broad; spores rather variable in form, elliptic, obovate, or subcymbiform, ·0005–·0006 long, ·0004 wide. It seems to come nearer to Corda's genus than any other. Had the perithecium been black, it might rather have been referred to *Coccularia* Cd." In recording this species in Sylloge Fungorum, III, 619, Saccardo stated "Sec. Berk. ad Myrosporium Corda propius accedit, quod vero genus est Myxomyces, teste Frieso," and, from the description, he placed it in *Aschersonia*, as *Aschersonia rufa* (B. & Br.).

In Herb. Peradeniya, Thwaites placed his Nos. 114 and 1016 on the same sheet, evidently regarding them as the same species, as they undoubtedly are.

The stromata are very variable in appearance. The smallest are about 0·4 mm. diameter, evenly pulvinate, dark red brown to almost black. Others are dark red brown, or purple black, placentiform, tuberculate at the margin and depressed in the centre, 1·5 mm. diameter and 0·3 mm. thick: while the largest are irregularly tuberculate, up to 4 mm. in diameter and 1·5 mm. high, with the same variation in colour. They look like groups of collapsed Nectrias, or like a small Tremellaceous fun-

gus, being rather hard, glabrous, slightly subtranslucent, and appearing as if subgelatinous when fresh. In spite of the variation in colour macroscopically, they all present the same appearance in sections by transmitted light. The interior is pale yellow, becoming red brown towards the exterior, with a deep red brown, or blackish brown, outer layer.

At the base of the stroma is a layer of hyaline hyphae, 3 μ diameter, forming a thin, rather loose, plectenchymatous tissue. Above this the fungus appear to consist entirely of oval or globose spores, pale yellow, thick-walled, minutely verrucose, 9–16 × 8–10 μ. On staining and examination with a high magnification, slender hyphae, about 1·5 μ diameter, are found between the spores. The spores appear to be borne laterally on the hyphae. The outer red brown layer consists of agglutinated spores and fine hyphae.

The fungus is apparently a Hyphomycete, belonging to the *Tuberculariaceae*. There appear to be several genera in which it might be placed, but most of them are insuffi iently known. It would seem that it might be included in *Illosporium*, judging from the descriptions of species which have been placed in that genus. It will then stand as *Illosporium annulare* (B. & Br.).

318.—Sphaeropsis Diospyri B. & Br

This was described by Berkeley and Broome in Fungi of Ceylon, No. 790, as "Nitida, congesta, incarcerata, epidermidem elevans; sporis magnis; paraphysibus longis (No. 1131). On fruit of *Diospyros embryopteris*. Peradeniya, Dec. 1868. Spores ·001 long."

Part of Thwaites 1131 is in Herb. Peradeniya. "Nitida" can only refer to the epidermis of the *Diospyros* fruit. The epidermis is raised in numerous, rather close-set, pulvinate elevations, either circular, 0·7 mm. diameter, or oval, 1 × 0·7 mm., and ultimately splits, usually longitudinally, over them. Beneath each elevation is a black stroma containing numerous pycnidia. The pycnidia are rather loosely bound together, and separate in free-hand sections. They are up to 0·3 mm. diameter, with separate ostiola, up to 40 μ diameter. The majority of the spores are immature, but dark brown, oval, one-septate spores, 26 × 14 μ. have been found. Long paraphyses are present.

The fungus is *Botryodiplodia*, and will stand as *Botryodiplodia Diospyri* (B. & Br.). Morphologically it is identical with *Botryodiplodia Theobromae* Pat.

319.—Sphaeropsis anomala B. & Br.

The description of this species, in Fungi of Ceylon, No. 788, is "Maculis minutis aterrimis rugosis, peritheciis confusis; sporis obvatis e stipite

brevi articulo divisis, demum uniseptatis (No. 481). On *Artocarpus Lakoocha* var., Peradeniya, Jan. 1868. Spores ·0013 long." In Saccardo, III, p. 300, the spores are given as 30–32 μ and the habitat "In ramis *Artocarpi Lakoochae*;" and it is suggested that the fungus may be a *Diplodia*.

The specimen, Thwaites 481, in Herb. Peradeniya is a leaf of *Artocarpus Lakoocha*, not a stem. The fungus occurs on the upper surface of the leaf in the form of minute, black, superficial pycnidia. These pycnidia are circular or oval in plan, up to 0·5 mm. diameter, sometimes confluent, conical with a flattened margin. The surface is rugose and the margin radially sulcate. Ostiola have not been observed, but in the majority of cases the apex of the pycnidium appears to have been damaged. By transmitted light, the wall of the pycnidium is opaque, except at the margin, which is dark brown, composed of parallel radial hyphae. The pycnidium is multilocular. There is no external mycelium, but the pycnidium arises from a hypostroma, about 20 μ thick and up to 200 μ diameter, embedded in the epidermis of the leaf. The spores are pyriform or turbinate, usually truncate at the base, or ovoid, truncate above and below, black-brown, ultimately opaque; they are borne on hyaline, cylindric pedicels, 16–26 × 4–5 μ, inflated below, which are often persistent. The spores have a single transverse septum at about one quarter the length of the spore from the base, and the upper loculus is usually strongly guttulate; they measure 24–32 × 12–17 μ.

This species is a pycnidial form belonging to the Dothideales. It appears to agree well with *Peltistromella*, and will stand as *Peltistromella anomala* (B. & Br.).

320.—Sphaeropsis seminicola B. & Br.

Berkeley and Broome's description of this species, in Fungi of Ceylon, No. 791, is "Minuta, gregaria, libera, setis rigidis sparsa; sporis oblongis obtusis (No. 1132). On seeds of *Artocarpus integrifolia*. Peradeniya. Dec. 1868. Spores ·0005 long." In Saccardo, III, p. 220, it was listed as *Pyrenochaeta seminicola* (B. & Br.) Sacc.

The specimen, Thwaites 1132, in Herb. Peradeniya, bears minute, irregularly circular, black spots, up to 0·2 mm. diameter, sometimes confluent. These prove to be subepidermal acervuli, which subsequently rupture the overlying epidermis, but do not open widely, as far as this specimen shows. The conidia are hyaline, cylindric with rounded ends, 12–18 × 3–4 μ. Some acervuli do not bear any setae, and are *Gloeosporium*. Others have numerous setae, and are *Colletotrichum*. In this specimen, however, the setae have been broken or bitten off, and only the bases are left in the acervuli, with fragments scattered over the host

tissue. They are dark brown, up to 7 μ diameter below, slightly expanded at the base, and have acute tips. Complete setae have not been observed.

There are also present on the specimen some loose spores of a *Melanconium*, brown, oval, lenticular, with a pale edge, 8 × 4 μ.

Berkeley and Broome's fungus is a *Colletotrichum*, which will stand as *Colletotrichum seminicolum* (B. & Br.).

321.—**Diplodia Cathartocarpi** B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 787, as " Peritheciis congestis e macula pallida oriundis minutissimis epidermidem elevantibus, ostiolo latiusculo ; sporis oblongis utrinque subalternatis (No. 525). On either surface of leaves of *Cassia fistula*, Damboul, Feb. 1868. Spores ·0005–·001 long by ·0002 Besides there are minute conidia ·00015–·0002." In Saccardo, III. p. 337, " subalternatis " was altered to " subattenuatis."

The specimen, Thwaites 525 in Herb. Peradeniya, is marked by Thwaites " on *Cassia Fistula*, Damboul." The leaves bear minute black spots, up to 0·25 mm. diameter, crowded together, on both sides of the leaf but chiefly on the lower. These black spots are parenchymatous sub-epidermal stromata. The epidermis ruptures in several places over each stroma, and a dense cluster of dark-brown, septate conidiophores, each about 20 μ high and 3·5 μ diameter, emerges. The initial perforation of the epidermis is usually circular, and these holes constitute the wide ostiola of the description. Conidia have not been observed *in situ* on the tufts, but large numbers of detached spores lie on the surface of the leaf. The spores are subcylindric, fusoid, or narrow-oval, pale fuscous, one-septate, often constricted, slightly attenuated or rounded at the ends, 16–19 × 4–5 μ. It is probable that these spores belong to the conidiophores, but the problem is complicated by the presence of an ascomycete, with thick-walled asci, 60–72 × 12–14, the immature spores of which (in the ascus) are narrow-oval or subfusoid, hyaline, one-septate, 14–17 × 3–4 μ. There are also, as noted by Berkeley and Broome, hyaline, oval or subglobose spores, 6–7 × 4–5 μ, apparently of a *Phoma*.

The principal fungus on the specimen is a *Fusicladium*. The leaf is not *Cassia Fistula*, but quite evidently *Pongamia glabra*. And the fungus is *Fusicladium Pongamiae* Syd. The name *Diplodia Cathartocarpi* may consequently be discarded.

322.—**Diplodia circinans** B. & Br.

In Fungi of Ceylon, No. 786, Berkeley and Broome described *Diplodia circinans*, as " Peritheciis circinantibus epidermide nigrifacta centro

pallido tectis ; sporis brevibus ellipticis obtusissimis (Nos. 356, 357). On *Yucca gloriosa*. Perithecia two to three under each spot ; spores ·001 inch long, ·0005 wide." They added "No. 358 is a variety with the pustules more scattered, but without fruit." In Saccardo, III, p. 371, the fungus is said to grow on *Yucca gloriosa* in Ceylon and *Yucca aloifolia* in North America. The latter record is from Berkeley's Notices of North American Fungi, Grevillea, III, p. 3, "*Diplodia circinans* B. & Br. var. *diffusa*. On *Yucca aloifolia*. No. 660. Also in Ceylon."

In Herb. Kew, Thwaites 356 is marked *Diplodia circinans* ; Thwaites 357, *Diplodia circinans* var.; and Thwaites 358, *Diplodia circinans* var. *diffusa*. They are all from the same locality, Nuwara Eliya.

In Thwaites 356, the leaf bears minute, oval, black rings, up to 0·4 × 0·3 mm., with a white centre, often confluent in twos or threes. The black ring is up to 0·1 mm. broad. These rings are arranged in concentric ovals, up to 2 × 1 cm., with others irregularly scattered. In section it is found that under each minute ring there is situated a flattened parenchymatous stroma, brown at the sides but hyaline in the interior. The brown coloration does not extend over the upper surface, and hence the stroma causes a black ring with a white centre on the overlying epidermis. The stromata in No. 356 appear to be solid and sterile.

In Thwaites 357, the minute ring spots are scattered, not circinating. They are larger, up to 1·5 mm. diameter, with a broader black ring, and elevated. The stroma ruptures the overlying epidermis, and ultimately crumbles and falls out, leaving a black cavity. Mature stromata are black (dark brown or red brown in section by transmitted light), and contain from one to four perithecial cavities, up to 0·3 mm. diameter. The spores are oval, hyaline, continuous, 20–24 × 8–12 μ. They are evidently ascospores, but the asci are either soon diffluent, or broken in these specimens, and only fragments of them have been observed.

In Thwaites 358, the ring spots are not arranged in any definite order, but they are more crowded than in Thwaites 356. The fungus is in a more advanced condition than in the latter, and the stromata show perithecial cavities, but they are immature.

This fungus is a *Botryosphaeria*. It is apparently identical with *Botryosphaeria Agaves* (P. Henn.) Syd. (*Physalospora Agaves* P. Henn.), but I have not seen authentic specimens of the latter.

323.—**Diplodia radula** B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 785, as "Peritheciis minutis epidermidem albifactam elevantibus, ostiolis distinctis ; sporis ellipticis (No. 305). On Musaceae.

Spores ·001 inch long, narrower than in the next spcies (*i.e. Diplodia circinans*), dark, with a wedge-shaped pedicel."

In recent specimens, on decaying leaf stalks of plantains, the pycnidia are 0·2–0·3 mm. diameter, scattered or clustered, immersed, elevating the epidermis in minute, white points. The spores are ellipsoid or oblong-oval, not constricted at the septum, 24–28 × 11–14 μ. The basidia are short and stout, up to 16×5 μ, sometimes attenuated upwards. Numerous linear paraphyses are present, up to 100 μ long and 2 μ diameter.

Grove, in Kew Bulletin, 1921, p. 143, suggests that this species is identical with *Macrophoma Musae* Berl. and Vogl., and possibly with *Botryodiplodia Theobromae* Pat. In spores and paraphyses it is indistinguishable from the latter, but the basidia appear to be stouter. It is, however, quite different from *Macrophoma Musae*, which has prominent stromata crowded on the living green tissue and making it appear rough. *Macrophoma Musae*, in the specimens collected in Ceylon, does not develop into a *Diplodia*.

324.—Diplodia zeylanica Tassi, **Diplodia striata** Tassi, **Diplodia Hurae** Tassi

In Bull. Lab. Ort. Bot., Siena, II, (1899) p. 154, F. Tassi described *Diplodia Hurae*, on seeds of *Hura crepitans*, and *Diplodia striata* on seeds of *Tectona grandis*, both from Ceylon; while in vol. III of the same journal, (1900), p. 19, he added *Diplodia zeylanica* on seeds of *Cyathocalyx zeylanicus* from Ceylon.

Diplodia zeylanica had pycnidia scattered or gregarious, 0·5–1 mm. diameter; spores, 25–26×12 μ; and numerous paraphyses, three or four times as long as the spores.

Diplodia striata had pycnidia, 0·3 mm. diameter; and spores, 18–20 × 12 μ, longitudinally striate. Paraphyses are not mentioned.

Diplodia Hurae had pycnidia 0·3–0·5 mm. diameter; and spores, 24–26 × 12 μ. The description does not refer to paraphyses.

The common *Diplodia* on decaying seeds or fruits in Ceylon is *Botryodiplodia Theobromae* Pat. In the case of dehiscent fruits which have a certain amount of pulp between the seeds, *e.g.*, *Cullenia excelsa*, this species will develop in abundance between and on the surface of the seeds, if the fruit is prevented from dehiscing completely when ripe, as is usually done with museum specimens. From the description, it would appear most probable that *Diplodia zeylanica* is identical with *Botryodiplodia Theobromae*. With regard to the other two species, the dimensions of the spores would not exclude them from *Botryodiplodia Theobromae*, but the descriptions do not mention paraphyses. As, however, very many

of the descriptions of *Botryodiplodia Theobromae* have been similarly deficient, the types of these two should be re-examined with that point in view.

325.—Pestalozzia congesta B. & Br.

In Fungi of Ceylon, No. 805, Berkeley and Broome described *Pestalozzia congesta* from Thwaites 511, as "Cellulis congestis prominulis brunneis ; sporis oblongis uniseptatis. On underside of leaves of *Syzygium Jambolanum*. Peradeniya, Feb. 1868. Forming little brown patches about a line wide." *Syzygium Jambolanum* DC. is *Eugenia Jambolana* Lam.

In the specimen in Herb. Peradeniya, the leaf bears minute, pulvinate, black elevations, about 0·5 mm. diameter, crowded together in groups up to 2 mm. diameter. The acervular loculi are lenticular, up to 250 μ broad and 100 μ high, on either side of the leaf, but chiefly on the lower, and do not open widely. The spores are borne on stout hyaline basidia, 6–18 μ high, expanding to 2 μ diameter at the apex, and are oval or subcymbiform, rather pale brown, one-septate, usually not constricted at the septum,rounded or truncate below, rounded at the apex, 17–26 × 8–10 μ. At the apex of the spore are from two to four, usually three, hyaline flexuose cilia, up to 32 μ long. There is no apical or basal hyaline cell, and no persistent hyaline pedicel.

When Saccardo listed *Pestalozzia congesta* in Sylloge Fungorum, III, p. 786, he added the comment, "Si conidia vere 1-septata, an novi generis typus ?." Subsequently he instituted the genus *Barklayella* for a one-septate *Pestalozzia* described by Ellis and Everhart, and later altered the generic name, which had been antedated, to *Neobarclaya*. He did not, however, include *Pestalozzia congesta* in his new genus. The Ceylon species is evidently *Neobarclaya*, and will stand as *Neobarclaya congesta* (B. & Br.).

An immature Pyrenomycete, apparently a *Micronectria*, accompanies the groups of acervuli.

Sydow has recorded *Neobarclaya natalensis* on *Eugenia Jambolana* from India.

326.—Gymnosporium confusum B. & Br.

Gymnosporium confusum was described by Berkeley and Broome in Fungi of Ceylon, No. 813, as "Effusum, nigrum ; sporis magnis subglobosis. With *Monotospora fusigera*. Spores ·0001–·0008 in diameter." In Saccardo, IV, p. 245, it was listed as *Coniosporium*. *Monotospora fusigera*, Fungi of Ceylon, No. 891, was said to be apparently on the leaves of some palm.

The fungus in the type is apparently on bamboo. The substratum is covered with a thin black powdery mass, which is composed chiefly of the hyphae and spores of the *Monotospora* intermixed with the spores of the *Gymnosporium*. On scraping off this surface layer, it is found that the *Gymnosporium* forms linear acervuli, up to 5 mm. long, 0·2–0·3 mm. wide, which develop beneath the outer layers of the host tissue and either split them longitudinally, so that the acervulus is bordered by the upturned epidermis, or cut out an oval scale, up to 1 × 0·3 mm.

The spores are biconvex, circular, 16–24 μ diameter, or oval, 17-32 × 14–24 μ, pale brown, thin-walled, minutely granular. There are slight indications of a paler edge, but the spores are not mature enough to show it definitely. It is probable that the spores have been affected by the *Monotospora*.

This species is a *Melanconium*, and will stand as *Melanconium confusum* (B. & Br.). In the formation of a scale, it resembles *Melanconium circumcissum* and *Melanconium Dendrocalami*. The former has smaller spores, but the latter is doubtfully distinct from *Melanconium confusum*.

327.—Gymnosporium lineare B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 814, as " Soris linearibus e cuticula bilabiatis ; sporis obovatis brevissime stipatis (No. 506). On *Andropogon muricatum*, March, 1868. Spores ·0005 long. " The specimen, Thwaites 506 in Herb. Peradeniya, is marked on " *Andropogon muricatus*, Damboul." In Saccardo, IV, p. 243, it is listed as *Coniosporium lineare* (B. & Br.)

Andropogon muricatus of Thwaites is *Andropogon muricatus* Retz., which is *Andropogon squarrosus* L. f. of Flora British India and Flora of Ceylon. It is now known as *Vetiveria zizanioides* Stapf.

The fungus is on the leaves of the grass, on which it forms black linear sori, up to 7 mm. long, on the under surface. The sori are bordered by the upturned tissues of the host, which gape rather widely, and have frequently a strand of the host tissue running along the centre from end to end. The leaf of *Vetiveria* consists of an upper and a lower layer of tissue united by transverse pillars, and thus contains large longitudinal air spaces. The fungus occurs in these air spaces, each sorus being confined to one of them, and it ruptures the thinner lower surface of the leaf. Frequently the rupture occurs along both sides of a vascular bundle, and the tissue containing the vascular bundle then persists as a longitudinal strand.

The spores are black in mass and completely fill the cavity for the length of the sorus. When viewed by transmitted light, they are

blackish-brown, very minutely warted or smooth. They are irregularly globose, quadrangular, or pentagonal, 6-10 μ diameter, with many irregularly oval spores of double that size, 13-16 × 8-11 μ. There are no basidia.

This is evidently an *Ustilago*, somewhat immature, and will stand as *Ustilago linearis* (B. & Br.). It does not appear to be markedly different from *Ustilago occulta* P. Henn, recorded on culms of *Andropogon* sp. from Brazil (1897), in which the spores are said to be 6-8 × 6-7 μ, with a minutely verrucose epispore.

Sydow has described *Ustilago effusa*, on *Andropogon muricatus* from India. It occurred on the leaves, sheaths, and culms. The sori are described as " longe lateque effusis ", and the spores as " minutissime verruculosis, 3·5-5 μ diameter. " The host plant would appear to be the same as the Ceylon species, but from the description the fungus would seem to be different.

328.—Gymnosporium circumscissum B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 811, as " Maculae oblongae ; cuticula circumscissa ; sporis niger-rimis globosis vel subglobosis laevibus (No. 1050). On bamboo. Peradeniya, Jan. 1869. Spores ·0003 long." In Saccardo, IV, p. 224, it was transferred to *Coniosporium*. Grove, in Kew Bulletin, 1918, p. 174, re-described it as *Melanconium circumscissum*.

The pustules are subepidermal, and the overlying epidermis breaks away as an oval scale when the pustule is mature. Sometimes the scale first splits down the centre, while in other cases it cracks radially into four. The pustules are circular or oval, 0·4-1·2 mm. long, 0·4-0·5 mm. broad. The spores are brown, circular in plan, 6-8 μ diameter, biconvex, with a pale margin which appears as a longitudinal band as the spore rolls over.

Melanconium Dendrocalami Petch has the same habit, but its spores are much larger, 20-24 μ diameter. In all other respects the two are the same.

329.—Oidium gilvum B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 895, as " Placentiforme, gilvum ; sporis obovatis e pedunculo tenui moniliformiter oriundo (No. 664). Looks at first sight very like an *Hypocrea* ; often crowded together, a line or more across, rather compact." In Saccardo, it was transferred to *Oospora*.

There are specimens in Herb. Kew and Herb. Peradeniya. The specimen in the latter herbarium consists of five pieces of bark, one of

which bears three minute, brown, placentiform stromata. These stromata are about 1 mm. diameter, and 0·7 mm. thick, compact, with a distinct cortex; they appear to be immature *Hypocrea*. The other four pieces do not bear any of these stromata. All the five pieces have minute white tomentose patches in cracks in the bark, which may be the bases of tufts of a hyphomycete, but nothing definite can be made of them. No obovate spores have been found.

Since Thwaites retained five pieces, only one of which bears brown stromata, one is led to imagine that there may have been present originally a hyphomycete which has since disappeared almost entirely through periodic preservation. Berkeley and Broome's description might then refer partly to the stromata and partly to the hyphomycete. "Placentiforme, gilvum" is a correct description of the immature *Hypocrea*, but the remainder of the description does not apply to anything now present.

Unfortunately the details given are too meagre to enable anyone to decide what the obovate spores were, and hence it would appear preferable to discard the name altogether.

During recent years the name *Oospora gilva* (B. & Br.) has been applied in some countries to the very common pink hyphomycete which develops freely on charred sticks in the Eastern Tropics. As has already been pointed out by Miss Wakefield, that hyphomycete is *Monilia carbonaria* Cooke, and it is probably identical with the conidial stage of *Melanospora erythraea*, described by Möller from Brazil. There is no trace of charring on the type specimen of *Oidium gilvum*.

330.—**Fusidium squamicola** B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 877, as "Luteum, floccis erectis ramosis, sporis oblongis brevibus (No. 441). On leaves of *Clerodendron*. Spores 5-9 μ long." They added the note, "It may perhaps be thought that this is only a morbid condition of the scales. This can be determined only on the spot; but at any rate it is worth recording."

The fungus has been collected recently on leaves of *Clerodendron fragrans*. It occurs on the under side of the leaf and apparently attacks the scales only. It appears first in minute tufts at the edge of the scale, with a few simple stout conidiophores, and subsequently covers the scale with a white loose mass, about 0·25 diameter, consisting of hyphae and conidiophores intermixed. The conidiophores are up to 50 μ high, branched; the branches are opposite, stout below, attenuated upwards, or narrow flask-shaped. The conidia are terminal, solitary, hyaline, narrow-oval or oblong-oval, ends acute, 3-5 × 1·5-2 μ.

Berkeley and Broome's "Luteum" is the colour of the scale. Their specimens are in an early stage, and show minute tufts, up to 100 μ broad and 30 μ high, projecting to the number of three or four from a scale. The conidiophores are simple, or once branched, stout, and obtuse at the apex. No spores 9 μ long have been found in the type; Berkeley and Broome may have measured a developing branch.

This species appears to be *Monosporium*, and will stand as *Monosporium squamicolum* (B. & Br.).

331.—Sporodum effusum B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 898, as "Strato atropurpureo effuso; floccis erectis hic illic monilia solitaria vel congregata e processu laterali ferentibus (No. 245). On the petioles of fallen leaves. Spores globose ·002 (inch) diameter." In Saccardo, Sylloge Fungorum, IV, p. 308, it was listed as *Dematium*, the spores being given as 5 μ diameter. On the drawing with the type specimen in Herb. Kew the spore is said to be 0·0002 inches.

The type specimen is on bamboo. The fungus forms dark purple-brown effused patches spreading over several centimetres. In the herbarium specimen, these patches are flattened, and consist of sheets of interwoven or depressed hyphae, 0·3 mm. thick. The basal layer is superficial, compact, 50—80 μ thick, and from this there arise flexuose, purple-brown hyphae, simple or branched, up to 200 μ long, 3-4 μ diameter, equal, septate, rather thick-walled, minutely verrucose. These hyphae bear short lateral branches at wide distances, either simple, oval, about 8 μ long, or elongated, one septate, constricted at the septum, up to 25 μ long. The conidia are borne in clusters at the apices of the short branches or at the apices of the long hyphae, and are globose, 3-4 μ diameter, red-brown, minutely verrucose.

This species is a *Trichobotrys*, and will stand as *Trichobotrys effusa*. Except in colour, it does not appear to differ from *Trichobotrys pannosa* Penz. and Sacc., judging from the figure and description of the latter. The colour of *Trichobotrys pannosa* was said to be "ex olivaceo nigricans."

332.—Mesobotrys graminicola (B. & Br.) Sacc.

Coniosporium cinctum (B. & Br.) Sacc.

In Thwaites 505, on *Andropogon*, Berkeley and Broome found two species, *viz.*, *Sporodesmium tessarthrum* B. & C., and *Chaetopsis graminicola* B. & Br. Another specimen on *Andropogon* was subsequently sent by Thwaites (No. 1140) and was marked by him, "sent before with No. 505," but Berkeley and Broome recorded it as *Gymnosporium cinctum* B. & Br.

Sporodesmium tessarthrum was originally described from Cuba. It was recorded for Ceylon in Fungi of Ceylon, No. 808, on *Andropogon*, March 1867 (Thwaites 505).

Chaetopsis graminicola B. & Br. was described in Fungi of Ceylon, No. 810, as " Sporis globosis quaternis laevibus (No. 505 in part). On leaves of *Andropogon*. Main filament subulate, articulated, dark below, nearly hyaline above ; spores globose, four together at the tips of the lateral basal threads. Habit exactly that of *Chaetopsis Wauchii* Grev. " In Saccardo, IV, p. 325, it was transferred to *Mesobotrys*, as *Mesobotrys graminicola* (B. & Br.).

Gymnosporium cinctum B. & Br. was described in Fungi of Ceylon, No. 812, as " Sporis globosis aterrimis, floccis erectis septatis cinctis (No. 1140). On leaves of *Andropogon muricatum*. Damboul, Nov. 1868. Spores ·0002 in diameter. Exactly the habit of *Excipula* ; but the spores are totally different and resemble those of *Gymnosporium*." In Saccardo IV, p. 243, it was listed as *Coniosporium cinctum* (B. & Br.), with the suggestion that it might be *Myrothecium* or *Chaetostroma*.

In Herb. Kew, Thwaites 505 is included under *Spegazzinia tessarthra* ; there is no specimen of *Chaetopsis graminicola* so labelled, but the *Spegazzinia* specimen contains both species. In Herb. British Museum the converse holds ; Thwaites 505 is included under *Mesobotrys graminicola*, with Broome's drawing, is marked " *Chaetopsis graminicola* growing with *Sporodesmiun tessarthrum*, " and contains both species.

The specimen of *Gymnosporium cinctum* in Herb. Kew is, as already stated, marked by Thwaites, " sent before with No. 505."

The species assigned to *Sporodesmium tessarthrum* B. & C., now known as *Spegazzinia tessarthra* (B. & C.) Sacc., appears to be correctly named. But *Chaetopsis graminicola* and *Gymnosporium cinctum* are identical, as Thwaites suggested.

Chaetopsis graminicola is superficial, forming black, oval or irregular patches up to 2·5 mm. long and 0·5 mm. wide, which consist of a purple-brown, or black, pulverulent basal mass from which arise numerous rigid, black, erect setae. These setae arise from all parts of the patch and are not confined to the margin ; they are up to 1·5 mm. long, 12 μ diameter below, tapering upwards, regular, black, becoming brown above and sometimes hyaline at the apex, with an obtuse apex, septate, the septa only visible in the lighter coloured parts. The basal layer of the fungus is an irregular, thin network of contorted, olivaceous hyphae, 1·5-3 μ diameter, from which the barren setae arise. Between the setae and arising from the same network are erect, regular, simple, pale brown, or subhyaline, septate conidiophores, up to 75 μ high and 3 μ diameter, which are strongly verrucose and bear conidia apically and laterally.

the conidia are globose, 4-5 μ diameter, or oval, 4-5 × 3 μ, yellow-brown to dark brown, minutely verrucose.

Berkeley and Broome's description, it will be noted, distinguished between the "main filaments," *i.e.* the barren setae, and the "lateral basal threads," which are the conidiophores; but the use of the term lateral was misleading in suggesting that the conidiophores were branches of the setae. They probably meant that the conidiophores were situated at the side of the setae, *i.e.* between them. The conidia occur in groups only by accident after abscission, and they are minutely verrucose under a high magnification.

It is difficult to understand how Berkeley and Broome came to make another species out of Thwaites 1140, especially in view of Thwaites' note. The fungus in the type of *Gymnosporium cinctum* is exactly the same as *Chaetopsis graminicola*, is quite superficial, and though its conidia are black in mass to the naked eye, they are brown by transmitted light. The setae do not surround the patch, but are scattered irregularly through it. The dimensions given by Berkeley and Broome for the conidia agree with those of the fungus examined, and there does not appear to be any other species in the specimen to which Berkeley and Broome's description could be applied.

Gymnosporium cinctum is consequently identical with *Chaetopsis graminicola*. It appears to agree well with *Lacellina* Sacc. (Ann. Myc., XI, p. 418), and will stand as *Lacellina graminicola* (B. & Br.).

333.—**Sporodesmium polymorphum** Cda.

This was recorded for Ceylon by Berkeley and Broome in Fungi of Ceylon, No. 809, from Thwaites 1030, the specimen being on dead wood.

In the specimen in Herb. Peradeniya, Thwaites 1030, the fungus forms thin, effused, compact, black patches. The hyphae or conidiophores are up to 70 μ high and 3–4 μ diameter, black-brown, or dark brown, septate, equal or moniliform, sometimes dividing above into two or three branches. They bear terminal spore clusters, or compound spores in chains, linked by short, septate hyphae, or almost in contact. From one compound spore, three chains of compound spores may arise. The compound spores are black and opaque, irregularly oval, 18–24 × 13–16 μ or irregularly globose, about 18 μ diameter. On heating with lactic acid or caustic potash, they become slightly more translucent, and then separate to some extent under pressure. The individual cells are polyhedral, rounded exteriorly, and 4-8 μ diameter. The compound spore is at first spherical, about 9 μ diameter, divided (in plan) by two diameters at right angles.

This fungus is evidently *Sirodesmium*, and it may be known as *Sirodesmium opacum* n. sp.

334.—Septonema olivaceo-nigrum B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 806, as " Pulvinulis tomentosis olivaceo-nigris congestis ; sporis 4-articulatis, articulis globosis, echinulatis e floccis ramosis articulatis oriundis (No. 248). Apparently on leaves of *Agave*. Spores ·0008 long."

This fungus in the type forms lax tufts, about 0·2 mm. diameter, with a pseudoparenchymatous base. These extend and become confluent in purple-black, effused masses. The hyphae are brown or black-brown, 4 μ diameter, regular, rigid, septate, smooth, much branched. The conidia are catenulate, either one-septate, oblong, with rounded ends, strongly constricted at the septum, black-brown, verrucose, 8–11 × 4--5μ, or three-septate, slightly constricted, sometimes only slightly verrucose, 14–28 × 5 μ.

335.—Triposporium Gardneri Berk.

This species was sent to Berkeley by Gardner in 1848, and formed the subject of " A notice of a mould attacking the coffee plantations in Ceylon," in Jour. Roy. Hort. Soc., IV (1849), pp. 7, 8. Berkeley there referred to it as *Triposporium Gardneri* and gave a figure, but he did not publish a description until 1873, in Fungi of Ceylon, No. 894. The description given there is " Olivaceum ; floccis fertilibus erectis articulatis, articulis constrictis ; sporis 6-8-septate acutis, apice hyalinis. On the under side of dead leaves. July 1848."

In his first notice, Berkeley stated. "The leaves are completely covered with a black sooty wash, and the trees must be in a sad plight ; for not only are they smothered with the fungus, but they are weighed down with masses of a gelatinous lichen belonging to the genus *Collema* or some closely allied group, which, though merely forming small radiated black specks when dry, on the application of moisture instantly swells and increases immensely in volume. Mr. Gardner's observation that the fungus is always preceded by an insect is exactly in accordance with what often takes place in similar affections here."

Gardner wrote a " Report on the Brown Scale, or Coccus, so injurious in the coffee plants in Ceylon," in which he referred to the fungus as an *Antennaria*, and gave figures. This appeared in Hooker's London Journal of Botany, II (1850), pp. 353-360, and III (1851), pp. 1-9 ; and was re-published in Ceylon in 1885. Gardner stated " As certainly as

the scale never appears on the upper surface of the leaf, so surely does the *Antennaria* or fungus never appear on the under one."

The fungus occurred on living leaves, and on the upper surface. The type specimen shows the usual accumulation of species found on the upper side of smooth leaves, *e.g.*, *Cinnamomum ovalifolium*, following scale insects, in up-country districts. The black specks referred to by Berkeley are an *Atichia*, probably *Atichia Millardeti*, which frequently occurs in such situations, and there is also a Trichopeltaceae present. The mycelium on the leaf forms a thin membrane, consisting of a network of olivaceous hyphae, 5–12 μ diameter. The hyphae are verrucose, regular, or closely septate, constricted at the septa and moniliform. The conidia are scanty and often broken; the arms of the spores now present are up to 64 μ long, 14 μ diameter at the base, with septa 12–16μ apart, sometimes even, sometimes strongly constricted and moniliform. Berkeley's figure shows the arms nine times as long as broad, with a hyaline, non-septate tip, up to one-third the length of the arm. The specimen is not now in good condition, and probably the larger spores have been brushed off. Berkeley stated that the spores were sometimes elongated at the apex and proliferous, and he figured that condition. It would seem probable that the latter figure represents mycelium only.

Gardner's figures show only mycelium. His figure 14, "a branch bearing seeds," is a hypha with a foreign body attached to it.

336.—**Arthrobotryum curvulum** (B. & Br.) Sacc.

This species was described by Berkeley and Broome under the name *Graphium curvulum* in Fungi of Ceylon, No. 901. The brief description is "Sporis curvulis elongatis 6–7 septatis." It was Thwaites 342 and was said to occur on bark with *Thelephora pedicellata*. In Saccardo, Sylloge Fungorum, IV, p. 629, it was listed as *Arthrobotryum*. Thwaites 342 provided the specimen which was recorded in Fungi of Ceylon, No. 574, as *Thelephora pedicellata* Schw.

There is no specimen marked *Graphium curvulum* or *Arthrobotryum curvulum* in Herb. Kew or Herb. British Museum. Thwaites 342 was apparently included under *Thelephora pedicellata* only.

An examination of the specimen, Thwaites 342, in Herb. Kew and Herb. Peradeniya has failed to disclose any *Arthrobotryum*. The hair-like pillars which fringe the stroma are, of course, the pillars of the *Septobasidium* (*Thelephora*). Among the hyphae of the stroma, however, there occur a few hyaline, elongated, septate spores which are undoubtedly the conidia of a *Microcera*, and it would seem probable that these spores provided the description of *Graphium curvulum*. It will be noted that Berkeley and Broome did not describe anything except the spores.

"*Septobasidium pedicellatum*" is parasitic on colonies of scale insects. It frequently happens that some of the insects have been previously killed by *Microcera*, *Tuberculariа*, etc., and in that case the *Septobasidium* grows over scale and fungus alike, the fructifications of the *Microcera* generally penetrating the *Septobasidium* if only the basal layer of the latter has been developed. I have not been able to find the synnemata of *Microcera* in Thwaites 342, but there can be little doubt that that has happened in this case. As it is not possible to decide to which *Microcera* the conidia belong, the name *Arthrobotryum curvulum* should be discarded.

337.—Dinemasporium gelatinosum B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 797, as "Superficiale, in epidermide nigra insidens ; sporis hyalinis magnis fusiformibus ellipticisve (No. 556). On dead twigs. Central Province, Feb. 1868. Spores ·0013 long."

In the specimen, Thwaites 556, in Herb. Peradeniya, the fungi are on pieces of a dead twig, and each arises from a small black spot. The spores agree in general shape with those of *Chaetospermum tuberculariоides* Sacc. (=*Tuberculariа chaetospora* Pat., Bull. Soc. Myc. France, IV, p. XL), and, Berkeley and Broome's description making no mention of the appendages, it was re-described in Ann. Perad., VI, p. 255, as *Chaetospermum gelatinosum* Petch. It will now stand as *Chaetospermum gelatinosum* (B. & Br.) Petch. The following description, based on fresh specimens, is repeated from Ann. Perad., *loc. cit.*

The sporodochia are subgelatinous, cylindric, up to 0·6 mm. high, 0·4 mm. diameter, with the base immersed in the substratum. The outer layers are composed of parallel hyphae, 3 μ diameter, which form a sheath and become gelatinous. The inner hyphae terminate as simple conidiophores, up to 30 μ high, 3 μ diameter, with terminal conidia, and are mixed with paraphyses, up to 80 μ long, 2 μ diameter, slightly thickened at the apex. The conidia are oval, inequilateral, or subcymbiform, hyaline, with granular contents and a stout wall, 1·5 μ thick, and measure 36–44 × 16–21 μ. At each end of the spore there is a tuft of six to twelve filaments, up to 80 μ long and 1 μ diameter, while along the more convex side of the spore are short filaments up to 10 μ long, or capitate appendages up to 4 μ long.

338.—Stilbum stromaticum Berk.

This species was described by Berkeley in Hooker's London Journal of Botany, II (1843), p. 642, from specimens collected by Gardner in Brazil, the description being, "gregarium, e stromate nigro inaequali ;

stipitibus compressis striatulis nigris ; capitulis aureis globosis ; sporis minutissimis subglobosis. Forming effused patches on the bark, springing from a black, smooth, undulated stroma, which has exactly the structure of a Sclerotium, consisting of angular cells, each of which contains a nucleus, those of the cuticle being darker and smaller. Stems distinct, 1·5–3 lines high, 1/8 of an inch thick, compressed, black, consisting of very fine fibres, externally slightly striate, surmounted by a yellow globule, which is coated with very numerous, extremely minute, subglobose spores."

It was subsequently recorded by Berkeley and Broome for Ceylon, in Fungi of Ceylon, No. 866, from Thwaites 1224, collected below Adam's Peak, February 1871. There are specimens of the latter collection at Kew and at Peradeniya. The date on the specimen in Herb. Peradeniya, Thwaites 1224, is February 1870, but it is undoubtedly part of the same gathering as that in Herb. Kew.

Bresadola (*fide* von Höhnel) redescribed the Brazilian species in Hedwigia, 1897, p. 302, which is not at present accessible to me. von Höhnel gave a full description of specimens from the same country in Eumycetes et Myxomycetes, Ergebnisse der Bot. Exped. der kaiserl. Akad. der Wissenschaft. nach Sudbrasilien, 1901, and transferred it to a new genus *Stromatographium*, as *Stromatographium stromaticum* (Berk.) v. H.

The Ceylon specimens contain two forms. In the one form, the stromata are superficial, up to 5 mm. diameter, black, thin, glabrous, irregularly furrowed and tuberculate, somewhat fleshy, not brittle, about 200 μ thick, brown internally, parenchymatous, with cells up to 10 × 6 μ. From these arise numerous synnemata, up to 4 mm. high, black, glabrous or minutely pruinose, sometimes longitudinally furrowed, up to 0·15 mm. diameter at the base, tapering to 0·075 mm. diameter at the apex. The heads are now yellow, subtranslucent, about 0·3 mm. diameter. When viewed by transmitted light, it is seen that the stalk terminates in a pale brown zone, while the centre of the head is dark brown. The conidiophores form a translucent zone 50 μ deep round the brown centre ; they are closely crowded, hyaline, filiform, branched, curved above, and bear minute hyaline conidia, either oval, 1·2 × 0·75 μ, or globose, 0·75 μ diameter. The conidia are agglutinated into a solid mass round the head. A few conidiophores are longer than the rest, and project beyond the hyaline palisade zone.

With these are a few other examples which at first sight appear quite different. These are fasciculate, with no evident stroma, or a slight stroma on one side of the group. They are up to 5 mm. high, with flattened stalks, up to 1 mm. broad below, flask-shaped or attenuated up-

wards. The stalk is rough with minute protuberances, especially towards the apex. The head is black, laterally compressed, reniform, 1·2 mm. broad, 0·4 mm. high, descending about 0·3 mm. on either side of the stalk and well defined from it. In section, the centre is pale brown, surrounded by a dark brown zone about 50 μ broad, and an outer compact layer of conidiophores, of about the same breadth. The conidiophores and conidia are the same as in the slender examples, but there is a larger number of elongated conidiophores, up to 180 μ long. There does not appear to be any doubt that these are merely larger examples of the same species.

The Ceylon form differs from the Brazilian, judging from von Höhnel's description, only in its thinner stroma. Berkeley evidently correctly referred the two collections to the same species.

339.—Isaria arcyrioides B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 864, as " Stipite nigro sulcato in capitulum clavatum desinente ; sporis metulaeformibus angustis pallidis (No. 122). Spores 12·5–18·75 μ long, one-third as much broad in the centre."

It has been found recently on decaying wood at Hakgala. The surface of the wood is blackened. The synnemata are clavate, up to 2·5 mm. high. The stalk is black, and the head grey, loose, ovoid or cylindric. The stalk in some cases is stout, 0·5 mm. diameter, and its constituent hyphae separate above to form the head; in other cases, it is slender, 0·2 mm. diameter, and is continued above as a columella in the centre of a cylindrical head. The conidiophores are branched, the ultimate branches being long and slender, and about 2 μ diameter, with terminal conidia. The conidia are hyaline or slightly fuscous, narrow-oval, with acute ends, 8-14 × 3–4 μ.

340.—Isaria aurantiaca B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 860, as " Congesta, lateritio-aurantiaca, cylindrica vel compressa, subramosa, radians ; sporis curvis (Nos. 253, 334). On bark and decorticated branches. Nuwara Eliya. Bright orange ; about a line high ; spores 0·0004 long." The second number should be 344. Thwaites 334 is *Grandinia lateritia*, Fungi of Ceylon, No. 561.

No. 253 was collected at Peradeniya on wood, and No. 334 at Hakgala on bark. The two fungi are totally different. No. 253 consists of minute black stromata, with a carbonaceous crust, deep red-brown internally. Some of these are broken and display the colour of the interior, while others bear Stilbum-like processes which may be a coni-

dial stage, or developing ostiola. Nothing matching this has been collected recently. On the other hand, No. 344 has been collected on several occasions during the last fifteen years in the Botanic Gardens, Hakgala, where it is nearly always to be found on some old specimens of *Apodytes Gardneriana*, relics of the former jungle ; it grows on the decaying bark scales of the living trees, not on wood. The description of *Isaria aurantiaca* was apparently drawn up from Thwaites 344, and hence the specific name is retained for the latter fungus. Thwaites 253 is immature and unrecognisable. The following description relates to *Isaria aurantiaca*, Thwaites 344.

The individual clavae are orange yellow, clavate or fusoid, subacute at the apex, about 2 mm. high, 0·4 mm. diameter, more or less tomentose, and rarely forked. They are rather loosely built of hyphae 2–4 μ diameter, which are encrusted with minute yellow granules. They occur crowded together in small clusters, more or less radiating from a centre, or in long lines in cracks in the bark. They arise from a yellow mycelium within the bark, but are very slightly attached and readily fall off. I have examined these clavae on many occasions, but have not been able to find any spores on them.

Arising among the clavae already described there occur others up to 1 cm. high, 0·6 mm. diameter below, greyish yellow, forked at about half their height, the branches forking again into comparatively long, simple, terete, acute tips. This is a *Lachnocladium*. It is composed of hyphae similar to those of the simple fusoid clavae, and all stages between the latter and the fully-developed *Lachnocladium* occur. The spores are white in mass, pale yellow when magnified, smooth, oblong-oval, inequilateral, 7–11 × 3–5 μ. It will be known as *Lachnocladium aurantiacum*.

The simple barren clavae occur in large numbers, but the fully-formed *Lachnocladium* is comparatively rare. There is no evident reason why the barren clavae should be produced in such profusion, and no similar case appears to have been recorded with regard to any other species of *Lachnocladium*.

341.—**Isaria pulcherrima** B. & Br.

Berkeley and Broome described this species in Fungi of Ceylon, No. 863, as " Alba, clavata, deorsum filiformis, villosa, e mycelio byssoideo quandoque repente oriunda, floccis fertilibus articulatis : sporis ex articulis enatis verticillatis (Nos. 219, 249). On fruit and leaves of palms. Sometimes scattered, sometimes crowded ; spores subglobose, ·00015 (inch) long." They gave figures, showing the conidia arranged in rings round the conidiophores.

In the type specimen, the synnemata are white or cream-coloured, up to 1·5 mm. high, scattered or somewhat clustered. Each arises from a small circular byssoid patch, and these patches may be confluent, but the "somewhat repent mycelium" noted by Berkeley and Broome consists rather of decumbent and weathered synnemata. The head is cylindric, about 0·4 mm. diameter and one-third the total height, or shorter and clavate. The stalk is about 0·1 mm. diameter, loosely fibrillose externally, with hypha of the same character as the conidiophores; when mounted, it appears yellow, and is continued almost to the apex of the head as a yellow columella.

The head is composed of rather loosely arranged conidiophores which spread at a small angle from the columella. The conidiophores are thick-walled, 2 μ diameter below, with clavate tips, up to 4 μ diameter; they are closely septate, especially above, where the septa may be only 6 μ apart. The apical cell is more or less ovate, sometimes acute above. The sterigmata are scarcely-elevated protuberances, up to 0·75 μ high; they occur anywhere along the conidiophore, or in a ring just below a septum, or scattered over the terminal cell. I have not seen any as long as those figured by Berkeley and Broome in their figure b. The old conidiophores are verrucose, probably with sterigmata.

The conidia are globose, 3–3·5 μ diameter, or broadly oval, 3 × 3·5 μ, hyaline, thick-walled, minutely verrucose.

Berkeley and Broome's figures are substantially correct. *Isaria cocoa* Lloyd, in Myco. Notes, No. 62, p. 925, would appear to be the same species.

342.—Actiniceps Thwaitesii B. & Br.

The genus *Actiniceps* was established by Berkeley and Broome in Jour. Linn. Soc., XV, p. 85. The description of the genus is "Stipes hyalinus, e floccis congestis in capitulum globosum radiantibus, hic in spiculas conicas vitreas granulatas desinentibus, illic in ramulos tenerrimos; sporae minutissimae." The species, *Actiniceps Thwaitesii*, was said to grow on dead coriaceous leaves, and to have a stem 0·017 (inches) high, and head 0·0065 (inches) diameter, with spicules "more like the parts of a sponge than of a fungus."

Berkeley and Broome gave figures of the entire fungus, the hyphae of the stem, a spicule, and a conidiophore with conidia.

In a part of the type specimen from Herb. Kew examined by me, the stalk is about 220 μ high and 62 μ diameter, slightly expanded at the base, equal, smooth, and composed of parallel thick-walled hyphae. The head is globose, about 0·1 mm. diameter. The spicules arise from, or are in continuation of, the outer hyphae of the stalk. In general, the spicules are broken: they are 8 μ diameter at the base, with an in-

ternal flask-shaped cavity, tapering, and minutely granular. In the centre of the head are the branched bases of the conidiophores, which are also granular. Conidia were not found.

In specimens recently collected at Peradeniya on dead leaves, the stalk is about 200 μ high and 60 μ diameter, pale brown becoming white above. The head is obconoid, about 0·2 mm. diameter, pale yellow. The hyphae of the stalk are thick-walled, but the outer layer is rather loose, and there is frequently a collar on the stalk below the head. All the spicules are marginal, *i.e.* they form a fringe round the lower edge of the head. The spicules are up to 300 μ long and 5 μ diameter at the base, with a minute central cavity, tapering regularly to the apex which is usually obtuse, smooth, thick-walled. The central hyphae of the head (conidiophores) branch repeatedly, all the branches being straight and at an acute angle, and terminating in slender simple basidia. The conidia are rod-shaped or narrow-oval, hyaline, continuous, 4–6 × 1 μ.

Berkeley and Broome's figure is incorrect in showing the spicules scattered over the head. Their specimens were evidently old and weathered, and had lost the looser outer layer of the stem, while their description and figure of the conidiophore and conidia apparently refer to some intrusive mould.

NAME INDEX.

	Page.
Actiniceps Thwaitesii B. & Br.	178
Actinothecium pelliculosum (B. & Br.) Petch	154
Amanitopsis vaginata (Bull.) Roze	121
Arthrobotryum curvulum (B. & Br.) Sacc.	173
Aschersonia rufa (B. & Br.) Sacc.	159
Botryodiplodia Diospyri (B. & Br.) Petch	160
Botryodiplodia Theobromae Pat.	160. 164
Botryosphaeria Agaves (P. Henn.) Syd.	163
Botryosphaeria catervaria (B. & C.) Sacc.	151
Botryosphaeria inflata Cke. & Massee	152
Botryosphaeria xanthocephala (Syd. & Butl.) Theiss.	152
Calonectria rigidiuscula B. & Br.	148
Calonectria sulcata Starb.	148
Chaetopsis graminicola B. & Br.	169
Chaetospermum gelatinosum Petch	174
Chaetospermum tuberculariodes Sacc.	174
Cladoderris Thwaitesii B. & Br.	134
Clavaria chlorina B. & Br.	145
Colletotrichum seminicolum (B. & Br.) Petch	162
Collybia endochorda B. & Br.	121
Coniosporium cinctum (B. & Br.) Sacc.	169
Coniosporium circumscissum (B. & Br.) Sacc.	167
Coniosporium confusum (B. & Br.) Sacc.	165
Coniosporium lineare (B. & Br.) Sacc.	166
Coniothyrium Lobeliae (B. & Br.) Petch	156
Corticium Habgallae B. & Br.	135
Dematium effusum (B. & Br.) Sacc.	169
Dermatodothis zeylanica Syd.	158
Diatrype catervaria B. & C.	151
Dinemasporium gelatinosum B. & Br.	174
Diplodia Cathartocarpi B. & Br.	162
Diplodia circinans B. & Br.	162
Diplodia Hurae Tassi	164
Diplodia radula B. & Br.	163
Diplodia striata Tassi	164
Diplodia zeylanica Tassi	164
Dothidea repens var. *catervaria* Berk.	152
Elmeria cladophora (Berk.) Bres.	129
Elmerina cladophora (Berk.) Bres.	129

Eriothyrium pelliculosum (B. & Br.) Grove .. 153
Flammula Janus B. & Br. 124
Flammula rhodomala (B. & Br.) Petch 125
Fomes rhinocerotis Cke. 147
Fusicladium Pongamiae Syd. 162
Fusidium squamicola B. & Br. 168
Grandinia granulosa Fr. 143
Grandinia lateritia B. & Br. 143
Grandinia papulosa B. & Br. 141
Graphium curvulum B. & Br. 173
Gymnosporium cinctum B. & Br. 169
Gymnosporium circumscissum B. & Br. 167
Gymnosporium confusum B. & Br. 165
Gymnosporium lineare B. & Br. 166
Hendersonia constricta B. & Br. 158
Hendersonia Symploci B. & Br. 157
Heterochaete discolor (B. & Br.) Petch 137
Heterochaete gelatinosa (B. & C.) Pat. 135
Hexagonia cladophora Berk. 129
Hexagonia membranacea Cke. 133
Hexagonia pergamenea B. & Br. 129
Hexagonia variegata Berk. 133
Hexagonia velutina Pat. & Har. 133
Hexagonia vespacea Pers. 129
Hygrophorus tricolor B. & Br. 122
Hypholoma fasciculare (Huds.) Fr. 123
Hypholoma Janus (B. & Br.) Petch 125
Hypholoma sublateritium (Schaeff.) Fr. .. . 125
Hypocrea albofulva B. & Br. 150
Hypocrea catoptron B. & Br. .. . 150
Hypocrea citrina var. B. & Br. 150
Hypocrea discella B. & Br. 150
Hypocrea multiformis B. & Br. 150
Hypocrea straminea Petch. . . 151
Illosporium annulare (B. & Br.) Petch. 160
Isaria arcyrioides B. & Br. 176
Isaria aurantiaca B. & Br. 176
Isaria cocoa Lloyd 178
Isaria pulcherrima B. & Br. 177
Kneiffia chromoplumbea B. & Br. 139
Kneiffia coriacea B. & Br. 137
Kneiffia discolor B. & Br. 136

Kneiffia gelatinosa B. & C. 135
Kneiffia insularis B. & Br. 138
Kneiffia isabellina B. & Br. 140
Kneiffia Muelleri Berk. 141
Kneiffia setigera Fr. 143
Lacellina graminicola (B. & Br.) Petch 171
Lachnocladium aurantiacum (B. & Br.) Petch .. 177
Lasiosphaera Fenzlii Reich. 146
Lepiota carpophylla B. & Br. .. . 119
Lepiota ceramogenes B. & Br. 120
Lepiota leontoderes B. & Br. . .. 119
Lepiota melichroa B. & Br. . .. 120
Lycoperdon fucatum Lév. 146
Lycoperdon rugosum B. & C. 146
Macrophoma Musae Berl. & Vogl. 164
Melanconium circumscissum (B. & Br.) Grove .. 167
Melanconium confusum (B. & Br.) Petch.. .. 166
Melanconium Dendrocalami Petch 167
Melanospora erythraea Möll. 168
Merulius versiformis B. & Br. 144
Mesobotrytis graminicola (B. & Br.) Sacc 169
Micropeltella Thwaitesii Petch 152
Micropeltis applanata Mont. 152
Monilia carbonaria Cke. 168
Monosporium squamicolum (B. & Br.) Petch .. 169
Monotospora fusigera B. & Br. 165
Mylitta australis Berk. 147
Mylitta lapidescens Horan. 147
Mylitta ligulata (Ces.) Petch 147
Myrosporium rufum B. & Br. 159
Nectria Bambusae B. & Br 148
Nectria bicolor B. & Br. 148
Nectria flavistroma Petch 149
Nectria flavolanata B. & Br. 148
Nectria flocculenta (Henn. & Nym.) v.H. 148
Nectria haematococca B. & Br. 148
Nectria luteococcinea v.H. 148
Nectria ochroleuca (Schw.) Berk. 148
Nectria pityrodes var. *saccharina* B. & Br. .. 148
Nectria sanguinea Fr. 148
Nectria stenospora B. & Br. 147
Nectria trichospora B. & Br. 148

Nectria villigera B. & Br. 150
Nectriella gigaspora Cke. & Massee 152
Neobarclaya congesta (B. & Br.) Petch 165
Neobarclaya natalensis Syd. .. . 165
Neopeckia constricta (B. & Br.) Petch 159
Odontia pallida Petch 136
Oidium gilvum B. & Br. 167
Oospora gilva (B. & Br.) Sacc. 167
Oudemansiella apalosarca (B. & Br.) Petch .. 123
Oudemansiella Canarii (Jungh.) v. H. 123
Panus coriaceus B. & Br. 128
Panus Berkeleyi Sacc. & Cub. 128
Peltistromella anomala (B. & Br.) Petch .. 161
Peniophora (*Scopuloides*) *ceracea* Petch 145
Peniophora fracta Petch. 145
Peniophora Habgallae (B. & Br.) Cke. 135
Peniophora setigera (Fr.) Bres. 143
Pestalozzia congesta B. & Br. 165
Phoma coryphae Cke. & Mass. 154
Phoma hysterioideum B. & Br. 156
Phoma Lobeliae B. & Br. 155
Phoma pelliculosum B. & Br. 153
Phyllachora catervaria (Berk.) Sacc. . .. 152
Physalospora Agaves P. Henn. 163
Pluteus phlebophorus Ditm. 123
Polyporus Berkeleyi Fr. 132
Polyporus cervinogilvus Jungh. 129
Polyporus diversiporus B. & Br. 129
Polyporus epilinteus B. & Br. 133
Polyporus Kermes B. & Br. 133
Polyporus melleus B. & Br. 132
Polyporus Peradeniae B. & Br. 129
Polyporus personatus B. & Br. 129
Polyporus variolosus B. & Br. 132
Polyporus Zealandicus Cke. 132
Polyporus zeylanicus Berk. 129
Polyporus zonalis Berk. 133
Polystictus Berkeleyi Bres. . .. 130
Polystictus pergameneus (Berk.) Bres. 132
Polystictus zeylanicus (Berk.) 129
Poria mellea B. & Br. 132
Poria setulosa P. Henn. 129

Poria variolosa B. & Br. 132
Poria vincta (Berk.) Cke. 133
Psathyra amaura B. & Br. 126
Psathyra efflorescens B. & Br. 126
Psathyra lucipeta B. & Br. 126
Psathyra obtusata Fr. 125
Psathyra reticulata Petch 125
Psathyra rufescens Petch 126
Psathyra spadiceogrisea Schaeff 125
Pseudonectria gigaspora (Cke. & Massee) Petch .. 152
Psilocybe bullacea (Bull.) Fr. 127
Sarcoxylon aurantiacum Pat. 146
Sclerotium (*Mylitta*) *ligulatum* Ces. 146
Septonema olivaceonigrum B. & Br. 172
Sirodesmium opacum Petch 172
Spegazzinia tessarthra (B. & C.) Sacc. 170
Sphaeria agnocystis B. & Br. 154
Sphaeropsis annularis B. & Br. 159
Sphaeropsis anomala B. & Br. 160
Sphaeropsis Diospyri B. & Br. 160
Sphaeropsis seminicola B. & Br. 161
Sphaerostilbe lateritia B. & C. 150
Sporodesmium polymorphum Cda. 171
Sporodesmium tessarthrum B. & C. .. . 169
Sporodum effusum B. & Br. .. . 169
Stereum (*Lloydella*) *coriaceum* (B. & Br.) .. 138
Stereum Thwaitesii (B. & Br.) Petch 134
Stilbum stromaticum Berk. 174
Stromatographium stromaticum (Berk.) v. H. .. 175
Stropharia pseudobullacea Petch .. . 128
Thelephora pedicellata Schw. . 173
Tomentella rufobrunnea Petch 144
Trametes dermatodes Lév. .. . 129
Trichobotrys effusa (B. & Br.) Petch . . 169
Trichobotrys pannosa Penz. & Sacc. .. 169
Triposporium Gardneri Berk. 172
Tuberculariа chaetospora Pat. . 174
Ustilago effusa Syd. 167
Ustilago linearis (B. & Br.) Petch . 167
Ustilago occulta P. Henn. 167
Volvaria geaster B. & Br. .. 122
Zythia annularis (B. & Br.) Sacc. .. 159

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The genus Cyanotis in Ceylon

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Sir J. D. Hooker, in Trimen's Flora of Ceylon, IV, (1898), p. 311, made the following note. "The species of *Cyanotis* are so very variable in habit and pubescence that probably more Sinhalese specimens than I have had access to are wanted to describe the following species satisfactorily." In view of this statement a large number of Ceylon specimens was collected and examined, and in this examination several errors were found in the descriptions of the Ceylon species. The key on p. 311 of the Flora needs correction in accordance with the differences observed. Only those species which have been wrongly described are re-described below, characters common to the several Ceylon species being enumerated under the generic characters.

Cyanotis Don

Annual or perennial herbs.

Roots fibrous, profuse, usually adventitious at the nodes, turning purple if exposed above the surface.

Stem profusely branched, creeping, decumbent, or erect, usually rooting at the nodes, often differentiated into foliage shoots and flowering shoots.

Leaves alternate, sessile, linear or linear-oblong to lanceolate; base sheathing.

Flowers in axillary and terminal, scorpioid, bracteate cymes, enclosed in more or less falcate, imbricating, biseriate, secund, foliaceous bracteoles, only the petals and stamens exserted; in *C. axillaris* the cymes are reduced to axillary fascicles of flowers within the ochrea.

Sepals 3, connate below, linear-lanceolate to lanceolate-ovate, keeled, persistent, the two interior almost falcate.

Petals 3, united by their claws to form a hyaline tube; lobes spreading. Corolla campanulate or funnel-shaped, soon caducous.

Stamens 6, all perfect, epipetalous: filaments subequal, filiform, contorted in bud, with heliotrope-coloured, moniliform hairs above the middle, fusiform beneath the acuminate tip, except in *C. cristata* and

C. pilosa : anthers basifixed, lobes parallel, oblong, dehiscing from the base along the outer edges : pollen orange-coloured.

Ovary sessile, hairy at the apex, 3-locular with two superposed ovules in each loculus, one erect and the other pendulous. Style linear, fusiform below the apex, naked or bearded. Stigma minute, terminal, punctiform.

Fruit enclosed in the dry cymes within the bracts and bracteoles and the persistent sepals, a very small, dry, oblong, chartaceous capsule, loculicidally 3-valved, usually 6-seeded ; valves loculicidally reflexed from the apex to the base, persistent ; placenta reflexed with the valves (in *C. tuberosa* var. *adscendens* the placenta remains as a central triquetrous column) ; walls brown, smooth, except at the hairy apex, with a well-marked transverse groove along the line of separation of the two seeds of each loculus.

Seeds angular, superposed : hilum almost punctiform, head to head, —if one ovule aborts the hilum is central : embryostega circular, umbonate, horizontal, apical in the upper and basal in the lower seed : testa firm, crustaceous, dark, rarely light coloured, sometimes obscurely vertically striated, on interior or both surfaces foveolate, rugose, or punctate. Embryo under the umbo, parallel to the axis of the capsule, vertical.

In all species, when favourable conditions prevail, vegetative propagation takes place. Except in *C. obtusa* Trim. and *C. tuberosa* var. *adscendens* Clarke, adventitious roots arise at the base of the leaf sheath and pierce it on the side opposite to the leaf. After flowers have been produced the axillary foliage bud grows through the base of the sheath on the same side as the leaf, the main stem dies off, and the branches develop into separate plants. Thus at each node vegetative propagation follows on sexual reproduction. In *C. obtusa* Trim. and *C. tuberosa* var. *adscendens* Clarke, vegetative propagation takes place similarly, except that the vegetative buds arise on the flowering shoots which thus serve as proliferating organs as well.

Key to the Ceylon species of Cyanotis

A. Fl. in scorpioid cymes with large imbricating bracteoles.
  1. Filaments fusiformly thickened below the tip.
    Style bearded.
      Root fibres slender
        Leaves 3-10 in. long, 0.75-1.5 in. broad, glabrous above, plant large — 2. *C. obtusa*
        Leaves 1-2 in. long, 0.2-0.3 in. broad, cobwebby, plant small — 6. *C. fasciculata*

Root fibres stout, ending in cylindrical tubers - 3. *C. tuberosa*

Style naked.

Stem trailing; leaves pubescent with short hairs, or if densely woolly equally pubescent on both surfaces 4. *C. zeylanica*

Stem creeping below, then ascending; leaves densely woolly pubescent only on lower surface 5. *C. villosa*

2. Filaments not fusiformly thickened below the tip.

Stem slender; leaves ovate-oblong, 1-3 in. long, 0.5 in. broad, sheath short 1. *C. cristata*

Stem stout below; leaves linear, acuminate, 2.5-8.5 in. long, 0.17-0.33 in. broad, sheath broad 7. *C. pilosa*

B. Fl. fascicled, bracteoles concealed in the leaf sheath. 8. *C. axillaris*

1. **C. cristata** Schultes *f.*, Syst., VII, 1150 (1830); Thw. Enum., 323; Clarke, Mon., 247; Fl. Brit. Ind., VI, 385; Trimen, Fl. Ceylon, IV, 311. Herm., Mus., 53. Burm., Thes., 94. Fl. Zeyl., No. 32. *Commelina cristata* Linn. Sp. Pl., 62. *Tradescantia cristata* Willd., Moon, Cat., 24. Bolhinda, S.

Stem much branched, branches decumbent, lower part purple, upper green: internodes 1-4 in. long, cylindrical, sparsely hirsute or densely and shortly pubescent along a single line reaching from the fused edges of the leaf sheath to the node above. Leaves ovate-lanceolate: sheath 0.5 in. long, green, with distinct purple venation, sparsely hirsute: blade 1.5-3 in. long, 0.4-0.8 in. broad, smooth, hirsute at the colourless margins. Cyme 0.5-0.75 in. long. Bract 2 in. long, 0.6 in. broad, ovate-lanceolate to ovate-cordate, base broadly cordate, amplexicaul, apex acute, colourless, margins colourless, hirsute only towards the apex. Flowers sessile. Sepals linear-lanceolate in outline, acute, boat-shaped and distinctly keeled; margins membranous. Corolla funnel-shaped, lobes semicircular with an acute apex and sinuate margins, light heliotrope. *Filaments not fusiformly thickened.* Style naked, fusiformly thickened at the apex.

Low country; a common weed. Fl. April; heliotrope.

2. **C. obtusa** Trimen, Fl. Ceylon, IV. 312. *C. arachnoidea* var, *obtusa* Trimen, in Journ. Bot., XXIII, 266, and Syst. Cat., 95. *C. arachnoidea Clarke* (in part) Fl. Brit. Ind., VI, 386.

3. **C. tuberosa** Schultes *f.*, Syst., VII, 1153 (1830) var. *adscendens* Clarke, Mon., 249 ; Trimen, in Journ. Bot., XXIII. 173, Syst. Cat., 95, and Fl. Ceylon, IV. 312. Golubellawel, S.

Root fibres stout, ending in cylindrical, fusiform, tubers about 2 in. long, 0.25 in. diameter: about a dozen such tubers to a shoot. Stem differentiated into a foliage shoot and a flowering shoot. Stem of foliage shoot about 1 in. long, enclosed within the sheaths of the leaves. Leaves 8-9 in. long, 0.45 in. at broadest, linear, boat-shaped without a distinct keel, fleshy, stiff, glabrous on the upper surface, hirsute with distinct venation on the lower : margins colourless, ciliate : apex acute : leaf sheaths 0.5-1 in. long, edges fused, dried, brown, the membranous remains enclosing the stem. Flowering shoots 2 or more from the axil of a leaf on a barren shoot, 1-1.5 ft. long, trailing, cylindrical, hirsute, swollen and jointed at the nodes, terminating in a cyme. Leaves of the flowering shoot 1 in. long, 0.25 in. broad, sheath 0.5 in. long, solitary at the nodes. Adventitious roots and one or more foliage shoots arise from the nodes of the flowering shoot. Here the flowering shoots serve also as proliferating organs. Cyme 1.5 in. or more long, curling downwards, resembling a small snail (hence its Sinhalese name), pubescent. Bracts lanceolate, acute, entire, partly sheathing, the upper surface glabrous, the lower hirsute. Bracteoles falcate. Sepals linear-lanceolate, acute, the inner surface glabrous, the outer densely woolly pubescent. Corolla light heliotrope ; lobes broadly ovate, acute. Filaments fusiform. Style fusiform, *bearded.* Ovary densely pubescent.

Damp sandy ground in the dry region ; very rare. Only found at Kirinde, S. Province. Fl. Dec., heliotrope, *not blue.*

Hooker *f.* has the following note in Trimen, Fl. Ceylon, IV, 313, " a most variable plant in habit, foliage, and pubescence. The Ceylon specimens are very poor, much smaller than the Peninsular (from which the description [in Trimen, Fl. Ceyl.] is chiefly taken), and more glabrous, with smaller, nearly sessile cymes. I have not seen the style of the Ceylon specimens. J.D.H." The description given above is from fresh specimens collected at Kirinde in December 1922.

4. **C. zeylanica** Hassk., Comm. Ind., 145 (1870) ; Clarke, Mon., 252 ; Fl. Brit. Ind., VI, 387 ; Trimen, Fl. Ceylon, IV, 313. *C. lanceolata* var. *subglabra* Thw., Enum., 323 ; C.P. 3223, 3216.

Stem cylindrical, trailing, reaching several yards in length : internodes 0·5-3 in. long, deep purple, covered with short glandular hairs. Leaves ovate, 1-2 in. long, 0·5-0·8 in. broad, acute, shortly ciliate towards the margins ; sheath 0·2-0·5 in., strongly hirsute, paler than the blade, with distinct purple veins. Cymes hirsute. Bract 1 in. long, 0·6 in. at widest, lanceolate, base rounded, shortly sheathing, glabrous, acute, margins hirsute. Bracteoles falcate, glabrous, acute. Flower shortly pedicelled. Sepals lanceolate. Corolla lobes broadly ovate, acute. *Filaments fusiform.* Style fusiform, naked.

Montane zone 4-6000 ft., rather common. Fl. Oct-Jan.; purple. Endemic.

5. **C. villosa** Schultes *f.*, Syst., VII, 1155 (1830) ; Clarke, Mon., 251 ; Fl. Brit. Ind., VI, 387 ; Trimen, Fl. Ceylon, IV, 313. *C. lanceolata* Wight, Thw. Enum., 323 in part. C.P. 2332.

Stem stout, cylindrical, creeping below, then ascending, reaching a length of several feet : nodes swollen : internodes about 1 in., purplish red, sparsely covered with long hairs ; from the overlapping edges of the sheathing base of the leaf above to the axil of the leaf below is a line along which the hairs are denser ; some internodes uniformly woolly pubescent. Leaves 1-3·25 in. long, 0·6 in. broad, fleshy, ovate to linear-lanceolate, acute or acuminate, entire ; upper surface glabrous and shining, lower woolly pubescent, green to purplish red ; veins distinct on the lower surface ; sheath usually more densely pubescent than any other part of the plant. Cyme woolly pubescent. Bract very much like a reduced leaf, about three times as long as the cyme. Bracteoles semi-ovate to semi-circular. Flower sessile. Sepals lanceolate-ovate, deeply keeled, glabrous except at the hirsute apex and the margins and keel. Corolla campanulate ; lobes semi-circular, acute. *Filaments fusiformly thickened*, curled like tendrils. Style fusiformly thickened, naked, curled.

Moist region 2-5000 ft.; rather common. Fl. Sept., Oct.

6. **C. fasciculata** Schultes *f.*, Syst., VII, 1152 (1830) ; Thw. Enum., 323 ; C.P. 2433 (*fide* Clarke) ; Clarke, Mon., 253 ; Fl. Brit. Ind.,VI, 387 ; Trimen, Fl. Ceylon, IV, 314.

Stem differentiated into foliage shoots and flowering shoots, floccosely silky or cobwebby. Foliage shoots decumbent and profusely branched, forming groups reaching about 1·5 ft. in length ; internode 0·75-1 in. long, wholly or partly enclosed within the leaf-sheath. Leaf linear, somewhat curved and fleshy, 3 in. long, 0·6 in. at broadest, lower surface paler, upper grooved along the middle, tapering, subapi-

culate, arachnoid. Flowering shoot 3·5-11 in. long, simple or branched, cylindrical, fleshy, arising from the ascending parts of the main stem : roots at nodes only if separated from the rest of the plant ; internodes 1-3 in., cottony pubescent. Leaves of the flowering shoot smaller than, but similar in appearance to, the leaves of the barren shoot. Flowering stalk in the axil of a leaf of the flowering shoot, bearing only a single lateral branch in the axil of a membranous leaf. Cymes shortly stalked, flat, urn-shaped, with or without cottony pubescence. Bracts lanceolate, acute, base plicate, woolly pubescent. Bracteoles falcate, acute, woolly pubescent. Flower almost sessile. Sepals lanceolate, acuminate, outer surface woolly pubescent. Corolla funnel-shaped, lobes broadly spathulate, acute. *Filaments fusiformly thickened. Style bearded* and fusiformly thickened.

Exposed rocky ground in the wet and the dry zones, up to 4,000 ft.; common. Fl. March, Oct.; bright violet blue.

7. **C. pilosa** Schultes *f.*, Syst., VII, 1155 (1830), *non* Wight ; Thw. Enum., 323 ; C.P. 2332 ; Clarke, Mon., 251 ; Fl. Brit. Ind., VI, 387 ; Trimen, Fl. Ceylon, IV, 314.

8. **C. axillaris** Schultes *f.*, Syst., VII, 1154 (1830) ; Thw. Enum , 323 ; C.P. 2330 ; Fl. Brit. Ind., VI, 387 ; Trimen, Fl. Ceylon, IV, 315. *Tradescantia axillaris* L., Moon, Cat., 24.

Stem slender, trailing, reaching about 2 ft. in length. Leaves few, linear, entire, sub-apiculate, glabrous. Several flowers arise in the axil of the same leaf. Flowers ochreate, pedunculate, pale violet-blue. Sepals lanceolate, keeled. Corolla lobes obcordate. Filaments fusiformly thickened. *Style naked*, fusiformly thickened.

Low country in both regions ; common. Fl. March, October.

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Sansevieria zeylanica Willd.

BY

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Brown, in his monograph of the genus *Sansevieria*, (2), p. 227, stated that he had not seen flowers of *S. zeylanica* Willd., and added, "It is remarkable that, although this species was one of the earliest to be described, yet it is one of the least known, or rather is practically an unknown plant to science, since in all modern descriptions, it is inextricably mixed up with the Indian *S. Roxburghiana* and *S. lanuginosa*, and the South African *S. aethiopica*. The confusion was begun by Willdenow himself, who mixed up two other species with this." He also remarked, "I think the specific name *zeylanica* should be exclusively applied to the Ceylon plant, which, with the exception of the living plants now at Kew.....does not appear to be anywhere in cultivation out of Ceylon, nor have I seen in any British or foreign Herbarium good dried specimens that I should unhesitatingly refer to the true Ceylonese plant.....in no single instance have I seen a localised dried specimen from Ceylon."

In the Peradeniya Herbarium there are two sheets labelled *S. zeylanica*. One, from a Kurunegala garden, has no flowers ; it bears the C.P. number 2297 and is probably from Thwaites' collection. The other, also without flowers, was collected by Trimen in January 1888 near Nilgala. Hooker *fil.*, (1) who amplified Trimen's manuscript notes, gives a description of *S. zeylanica*. These notes have been preserved with the Herbarium sheets, and in them Trimen records a description of a Ceylon *Sansevieria*, grown in the Royal Botanic Gardens, Peradeniya, and refers to "a good woodcut" of the plant in the Kew Bulletin of 1887. Brown (2) says that the latter is a figure of *S. Roxburghiana*. Hooker's (1) description is thus very probably of *S. Roxburghiana* and not of *S. zeylanica*, a confusion which might have arisen from an interchange of the labels in the Peradeniya Gardens. The late Mr. van Buuren, at whose suggestion this work was undertaken, told me that plants of *Sansevieria*, obtained from the jungle and transplanted in the Peradeniya Gardens, did not flower even once during the five years he had them under observation. That has been my experience

too, with similar specimens grown in the gardens for the past two years. These observations tend to confirm the suspicion that Trimen's description is that of *S. Roxburghiana*.

The description of *S. zeylanica* Willd. given below is from specimens obtained in the jungle at the foot of Doluwe Kande and from the Anuradhapura district.

Sansevieria zeylanica Willd. Sp. Pl., 11, 159 (1799); Moon, Cat., 25; Thw., Enum., 338. Herm., Mus., 56. Burm., Thes., 11. Fl. Zeyl., n. 130. Niyanda, S. Maral, T.

Stemless. Rootstock creeping, stoloniferous, yellowish white, several feet long. Plants twenty to thirty in a single clump. Leaves 5-12 to a growth, recurved from a little above the middle, erect or ascending; the outer about 2·5 ft. long, 1·3 in. wide at broadest, lanceolate, more or less flat: the inner longer and thicker than the outer: all leaves subapiculate, ending in a sharp brown spine, 0·2-1 in. long, colourless and sheathing at the base for a length of 1-3 in.; both surfaces slightly shining, gland-dotted, and smooth, the lower less so; all leaves with transverse bands of light and dark green merging one into another; margins membranous, colourless or green, turning brownish-red as the leaf ages; the inner leaves in transverse section concave-channelled and very nearly semi-terete; *all leaves longitudinally furrowed on the back.*

Brown (2), p. 226, described the furrows as occurring only on withered leaves of *S. zeylanica*, and used this as a specific difference to distinguish between *S. zeylanica* and *S. lanuginosa* (p. 193).

Inflorescence a scape 13·5-23 in. high, arising from the centre of the plant within the leaves. Scape terete, fleshy, colourless for about 2 in. from the base, then green with reddish green spots: young scapes purple. At distances of 4 and 6·25 in. respectively, are two submembranous sheaths, the lower 0·75-1·6 in. long, and the upper 0·4-0·5 in. long; both sheaths green and glabrous with distinct venation, margins membranous, tapering to a minute, subulate, dark green spine.

Flowers on a minute swelling, in suberect fascicles of 6, which are distant from one another at the lower end, becoming more crowded towards the tapering apex of the scape. The lowest fascicle 7·5 in. from the base. Each fascicle in the axil of a membranous, linear, acuminate bract about 0·5 in. long. Each flower in the axil of a minute, scale-like, ovate, acute bractlet.

Pedicel of each flower about 0·25 in. long, fleshy, jointed near the base; the lower part purple, the upper green. The flower is often deciduous about this joint.

Flower about 0·6-0·9 in. long, 0·2-0·5 in. across, pale greenish-white, somewhat scented.

Perianth lobes 6, united along a third of their length. Each lobe 0·6 in. long, oblong, linear, white with a greenish-white to purple, rounded, boat-shaped, curled apex : base yellow-green.

Stamens 6, epipetalous and opposite the perianth lobes ; filaments tapering ; anthers versatile, sagittate, yellowish-green.

Ovary 0·1 in. long, trilocular, trigonous, smooth, glabrous, with a single basifixed ovule in each loculus ; style about 0·8 in. long, fleshy ; stigma triangular.

Fruit a globose berry, 0·4-0·6 in. in diameter, on a jointed stalk. Only one or two of the ovules are fertilised, and the fruit is either single or bi-lobed accordingly, the sterile loculi persisting as minute swellings at the base of the berry.

Seed creamy-white, broadly ovoid, horny, about 0·25 in. long, with a large yellow patch on the exterior ; embryo small, marginal.

Common in rocky or sandy places in the dry region.

Brown (2), p. 228, says that *S. Roxburghiana* can easily be distinguished from *S. zeylanica*, "for its leaves are mostly shorter, much thinner and consequently less rigid than those of *S. zeylanica*, also of a rather lighter and different tint of green." *S. Roxburghiana* also differs from *S. zeylanica* in that, 1, leaves of the former have green edges which change to white as the leaf ages whereas those of the latter turn to a brownish-red ; 2, the scape of the former has four to five membranous sheaths while that of the latter has only two membranous sheaths ; 3, the flowers of the former arise in groups of about four and of the latter in groups of six.

REFERENCES.

1. Hooker, J. D. in Trimen, Flora of Ceylon, IV (1898), p. 267.
2. Brown, N. E. Monograph of the genus *Sansevieria*. Kew Bulletin, 1915, No. 5, pp. 185-261.

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Plaesianthera

BY

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In Flora British India, Clarke (2), after his description of *Cardanthera Thwaitesii* Benth., wrote, " Possibly a distinct genus resembling *Brillantaisia* except that it is the posterior stamens that are imperfect in this." Trimen (3) stated of the same plant, " Forms a very distinct sub-genus, *Plaesianthera*, Clarke, which ought rather to be considered distinct from *Cardanthera*."

Bentham and Hooker f. (1) gave, among the other characters of the genus *Cardanthera* Hamilt.,

1. Flores ad axillas sessiles v. breviter pedicellati, *solitarii v. plures*, 2-*bracteolati*, v. rarius cymae axillares laxi florae.
2. Calyx 5-partitus, segmentis angustis subaequalibus v. postico majore.
3. Corollae limbus *longe* 2-*labiatus* antico erecto-patente apice 3-lobo infra lobos *saepius* 2-*plicata*.
4. Stamina perfecta 4, *didynama*, *v.* 2 *antica*.
5. Filamentis basi breviter dilatatis.
6. Antherae *oblongae loculis parallelis*.

This enumeration of the generic characters of *Cardanthera* was based upon ten species, including *C. Thwaitesii* Benth., which differs from the other nine as shewn in the table given below.

C. Thwaitesii Benth.	Other *Cardanthera* spp.
1. Flowers solitary in alternate axils.	Flowers spiked or whorled in opposite axils.
2. Bracteoles none.	Bracteoles 2.
3. Calyx 5-partite, segments unequal.	Calyx 5-partite, only the posterior segment larger.
4. Corolla shortly 2-lipped.	Corolla deeply 2-lipped.
5. Corolla palate plane.	Corolla palate transversely plicate-rugose.
6. Stamens 2 ; staminodes 2.	Stamens 4 perfect.
7. Filaments uniform, tapering to the narrow apex.	Filaments dilated at base.

8. Anther lobes subquadrate, united to form an almost horse-shoe shaped anther.	Anthers oblong, lobes parallel.
9. Seeds with slightly curved, strong retinacula.	Seeds with minute, straight retinacula.

In view of these differences, *C. Thwaitesii* should be placed in a genus distinct from *Cardanthera*. Clarke's sub-genus *Plaesianthera* should therefore be given generic rank.

Plaesianthera (Clarke), nov. gen. Acanthacearum.

Herba erecta. Folia opposita. Bracteola nulla. Flores solitarii. Calyx 5-partitus, segmentis inaequalibus. Corollae tubus superne ampliatus ; limbus breviter 2-labiatus, labio postico erecto concavo breviter 2-lobo, antico erecto patente apice 3-lobo. Stamina 2, antica, supra medium tubum affixa ; filamenta non basin dilatata ; antherae subquadratae, loculis non parallelis. Stylus apice linearis ; ovulae in loculis numerosae. Capsula oblongo-linearis. Semina parva, ovata compressa, in retinaculis dilatatis fulta. Monotypic and endemic Genus.

Plaesianthera Thwaitesii (Benth.) Livera, comb. nov.; *Adenosma Thwaitesii* T. And.; *Cardanthera Thwaitesii* Benth., Gen. Pl., II, (1876), 1075.

Caulis erectus, viscidulus, villosus, racemosus ; folia integra, spathulata v. lanceolata, subpetiolata, hirsuta, subtus glabrescentia ; flores solitarii in cymis laxis ; bractea parva. Calyce capsula dimidio brevior.

Roots fibrous, adventitious, the main root being short in most specimens. Stem herbaceous, 4-12 in., erect, pyramidally much branched, terete below, quadrangular above, densely glandular hairy. Leaves numerous, opposite ; on the main stem 1-1.5 in., lanceolate or spathulate; on the branches 0·25-0·75 in., oval ; all obtuse or subacute, faintly crenate, almost entire, tapering to the short petiole, hirsute, paler beneath. Inflorescence a dichasial cyme, becoming sympodial, the upper branches having one branch and one flower suppressed. Pedicel 0·2-0·3 in. long. Bracts like very reduced leaves. Bracteoles 0, calyx 5-partite, lobes linear, unequal, outer surface glandular hairy. Corolla 2-lobed, lobes twisted to left, not transversely plicate. Stamens 2, epipetalous ; anthers introrse, lobes subquadrate, fused at the apex, forming an almost horse-shoe-shaped structure but with the apex more acute. Ovary glabrous. Style sparsely hairy. Capsule 0·25 in.; seeds many, ovoid, compressed ; retinacula conical, slightly curved.

Dry region, rare ; Batticaloa District, abundant ; Karamunai. Fl. March.

REFERENCES.

1. Bentham and Hooker *f.* Genera Plantarum, II (1876), p. 1075.
2. Clarke, C. B. Flora British India, IV (1885), p. 406.
3. Trimen, H. Flora of Ceylon, III (1895), p. 292.

The Jussiaeas of Ceylon

BY

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In his article of the Indo-Malayan species of *Jussiaea*, Ridley (1) mentions Ceylon as the habitat of only *J. erecta* var. *exaltata* Roxb. and *J. speciosa* Ridl. In the Peradeniya herbarium there are sheets of *J. erecta* L., *J. erecta* var. *exaltata* Roxb., *J. villosa* Lam., and *J. speciosa* Ridl. The descriptions given below are from the Ceylon specimens.

Key to the Ceylon Species of Jussiaea.

Stem creeping or floating.	1. *J. repens* L.
Stem erect.	
Plant nearly glabrous ; fruit narrow cylindric	2. *J. erecta* L.
Plant hairy	
Corolla 0·8 in. across ; sepals ovate, acute ; fruit thickly cylindric ; seeds grooved	3. *J. villosa* Lam.
Corolla 2 in. across ; sepals triangular, acuminate, cuspidate ; fruit obconic ; seeds not grooved.	4. *J. speciosa* Ridl.

1. **J. repens** L., Sp. Pl., 388 (1753) ; Fl. Zeyl., n. 169 ; Moon, Cat., 35 ; Thw. Enum., 123 ; C.P. 2793 ; Fl. B. Ind., II, 587 ; Hook. Bot. Misc., III, t. Supp. 40 ; Trimen, Fl. Ceylon, II, 233. Beru-diyanilla S.

2. **J. erecta** L., Fl. Zeyl., 170 ; Sp. Pl., 556 (excluding the S. American plants) ; *J. angustifolia* Lam.; *J. Blumeana* DC.; *J. Junghuhnii* Miq.; *J. suffruticosa* of Clarke and other botanists, not of Linnaeus ; *J. villosa* var. *subglabra* Thw., Enum., 123.; C.P. 1540; *J. suffruticosa* var. *subglabra* (Thw.) Trimen, Fl. Ceylon, II, 233.

Herb 1-1.5 ft. tall, glabrous, or sparsely hairy specially on the young parts. Stem woody at base, slightly winged above, once branched. Leaves 1-4 in. long, 0·2-0·9 in. broad, lanceolate, acute, tapering at base, subsessile, sparsely hairy ; veins ascending, about 16 pairs, slightly elevated beneath. Pedicel 0·05-0·1 in. Sepals 4, ovate, 0·2-0·25 in. long,

acuminate, 3-veined, hairy. Corolla 0·75 in. across ; petals obovate, emarginate, clawed, distinctly veined. Stamens 8. Ovary 0·3-0·4 in. long. Style short and thick. Fruit 1-1·5 in. long, 0·2 in. across at top, oblong, obcuneate, glabrous, broadest above, narrowed at base. Seeds ellipsoid, polished, mahogany brown.

Var B., **exaltata** Roxb. Leaves linear, with more numerous, short hairs on both surfaces.

Distribution. Wet places in moist low-country to 3000 ft.; common. Fl. Feby. Var. B, Bandarawela, Sept.

Ridley (3) does not mention the last two synonyms ; perhaps he did not see the Ceylon specimens of *J. erecta* L.

3. **J. villosa** Lam., Encycl., III, 331 ; C.P. 3297, 2794. A tall, woody, densely hairy shrub. Leaves 1·7-3·7 in. long, 0·35-1·1 in. broad, lanceolate, narrowed at both ends, shortly petiolate or sessile, hairy all over. Sepals 0·3 in. long, 0·15 in. wide at base, ovate, acute, hairy outside. Corolla 0·8 in. across ; petals oblong oblanceolate, retuse, 0·3 in. across. Ovary cylindric, hairy, 0·4-0·6 in. long. Fruit 1-1·25 in. long, 0·25-0·5 in. across, stoutly cylindric, base narrowed. Seeds dark red, ellipsoid, grooved.

Distribution. Near Galle ; Kandy. Fl. Sept., Oct.

4. **J. speciosa** Ridley, Journ. Bot., 1921, p. 259. Plant 3-4 ft. tall, densely softly tomentose-hairy all over. Leaves 2·5-3·5 in. long, 1 in. broad, lanceolate, narrowed at both ends ; petiole 0·25 in. long. Flowers 2 in. across, solitary, axillary. Pedicel 0·45 in. long, quadrangular, pubescent. Bractlets 2, lanceolate, acute, 0·4 in. long. Sepals 4, 0·55 in. long, 0·27 in. broad, triangular, acuminate, cuspidate, densely hairy on outer surface. Petals 0·8 in. long, 1 in. broad, obovate, retuse, distinctly 15-veined, shortly stalked. Stamens 8 ; filaments twisted in a counter-clockwise direction. Anthers extrorse. Stigma viscid, dome-shaped ; ovary 0·6 in. long, pyramidal. Capsule obconic, densely softly hairy. Seeds ellipsoid, not grooved, red.

Distribution. Haragama ; Maturata ; Peradeniya. Fl. Jan-June; bright yellow.

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Ceylon Pink-spored Agarics.

BY

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The majority of Berkeley and Broome's species of *Rhodosporae* have not been recognised during the last eighteen years, and consequently re-description has not been possible. Notes on these, from the herbarium specimens and paintings, are included below. Measurements of the spores, and details regarding the presence or absence of cystidia in the herbarium specimens, have previously been published by Massee (Grevillea, XXI, pp. 77-82). Massee found that cystidia were wanting in most of the Ceylon species, and in general it has been possible to confirm his statement, as far as regards the herbarium specimens. But in this respect the herbarium species are apt to be misleading. In some cases, cystidia are well-preserved on the dried specimens, but in a recent examination of specimens collected during the last ten years I have failed, after repeated attempts, to find cystidia on some herbarium specimens on which cystidia were seen, measured, and described when fresh. Consequently it is not possible to decide that a species lacks cystidia, from failure to find them on a herbarium specimen.

VOLVARIA

Berkeley and Broome enumerated nine species of *Volvaria* in the Fungi of Ceylon. Coloured figures of two of these, *Volvaria terastia* B. & Br. and *Volvaria diplasia* B. & Br., were reproduced in Trans. Linn. Soc., XXVII, plates 33, 34, and there are paintings of four other species in Herb. Peradeniya. One species, *Volvaria Geaster* B. & Br. is a partly-expanded specimen of *Amanita vaginata*. One European species, *Volvaria volvacea* Bull., was recorded, and of the remainder two are generally large species, three are of medium size, and two are very small. Thwaites's collection numbers are somewhat confusing. *Volvaria diplasia* and *Volvaria terastia* were sent as 689 and 689 bis, while other collections were sent together in various combinations of the numbers 709, 777, and 790. Thwaites had apparently regarded the last three collections as the same species, and in Herb. Peradeniya the specimens of these three numbers are mounted on one sheet.

Volvaria terastia B. & Br. was re-described in Ann. Perad., IV, p. 40. The pileus attains a diameter of 20 cm., and is blackish brown, dark purple brown, grey, or brownish grey, densely clothed with radial adpressed silky fibrils. The stalk is white or grey, and up to 15 cm. high. The volva is usually large and stout, and black or blackish brown externally; internally it may be marked with distant yellow-brown patches. When the fungus expands, the surface of the volva usually splits into more or less rectangular areolae, separated by white bands. The spores are deep Indian red in mass, brownish by transmitted light, thick-walled, subglobose, 3·5-6 μ, or broadly oval, 5-6 × 4-5 μ, sometimes somewhat pyriform, with a prominent apiculus; the thick wall is penetrated nearly to the exterior by a narrow canal beneath the apiculus. Massee, Grevillea, XXI, pp. 77-82, gave the dimensions of the spores as 4 μ, or 4 × 3 μ. It grows on the ground.

In one example, the unopened volva had a shining, yellow-brown surface, which split into areolae bordered by sloping sides of grey hyphae.

Volvaria diplasia B. & Br. This species was re-described in Ann. Perad., IV, p. 51. It is usually smaller than *Volvaria terastia*. In the typical form the pileus is pale yellow or greyish white, up to 11 cm. diameter, densely clothed with fascicles of short silky hairs. The stalk is white, strongly attenuated upwards and more or less conical. The volva is thin, lax, usually sheathing the stem, tough, white or pale-brown and smooth externally, white with scattered yellow spots internally. The spores are deep Indian red in mass, but not markedly coloured when examined by transmitted light; they are oval, sometimes inequilateral, 7-10 × 4-5 μ. The edge of the gills bears oval cystidia, 50 × 28-30 μ, sometimes attenuated above and broadly flask-shaped.

This species grows on decaying stumps or wood, or on dead leaves matted together by mycelium. The form described by Berkeley and Broome is greyish white, but the colour is variable. In one example, partly hidden by a decaying log, the exposed half of the pileus was golden yellow and the shaded side pure white. Some specimens are blackish, and closely resemble *Volvaria terastia*, and the surface may split into radial anastomosing lines of blackish-brown silky fibrils.

Berkeley and Broome cited Thwaites 689 as *Volvaria diplasia* and 689 bis as *Volvaria terastia*. The spores of Thwaites 689 in Herb. Kew are oval, sometimes inequilateral, 7-10 × 4-5 μ, while those of the same Thwaites number in Herb. Peradeniya are 6-9 × 4-6μ The Kew specimen shows cystidia on the gill edge. Thwaites 689 bis in Herb. Peradeniya is immature as to one specimen, while the other has

spores, globose, 3·5-6 μ, or broadly oval, 5-6 × 4-5 μ, identical with those described above for *Volvaria terastia*.

Volvaria volvacea Bull. This was recorded for Ceylon by Berkeley and Broome from Thwaites 790. The specimens in Herb. Kew have the pileus radially streaked with black lines, and in one the volva is feebly areolated. The spores are oval, 7-9 × 4-5 μ. There is a corresponding specimen, but small, on the sheet marked 777, 709, 790, in Herb. Peradeniya. These specimens are *Volvaria diplasia*.

Volvaria pseudovolvacea B. & Br. This was described by Berkeley and Broome from Thwaites 709, 777, 790, in part. They also described *Volvaria apalotricha* B. & Br. from Thwaites 709, *cum icone*, and *Volvaria coleata* B. & Br. from Thwaites 709,* *cum icone*. There are three figures in Herb. Peradeniya, one marked "709, a small form of 790", another, "709, 20 August. 1868," and a third, "Pileus delicately pilose, No. 709,* 15th August, 1868." The figures appear to be all the same species.

In Herb. Peradeniya, there is one sheet, marked 709, 777, 790, bearing specimens which vary from 3 mm. to 5 cm. in diameter. One specimen is *Volvaria diplasia*, as noted above. The larger specimens have spores 5 × 3 μ. The very small specimens have smaller spores, 3·5-5 × 3 μ.

In Herb. Kew, *sub Volvaria pseudovolvacea*, there are three sheets. One is marked by Thwaites "Nos. 709, 777, 790, Peradeniya, December. 1868-Jan. 1869, sent before, but I fear with other species admixed. This differs from those in having a volva and a pileus striato-ciliate;" the spores of these are oval, inequilateral, 4-6 × 3-4 μ, or globose, 3-4 μ. Another is marked "709 and 790, intermediate between the specimens sent you under these numbers, Peradeniya, Nov. 1868;" the spores of these are oval, 4-6 × 3-4 μ. The third sheet, No. 777, bears specimens with spores 7-10 × 4-5 μ, which are *Volvaria diplasia*.

For *Volvaria apalotricha* B. & Br., Berkeley and Broome cited Thwaites 709, *cum icone*. The specimen in Herb. Kew is marked by Thwaites, "709 (small form of No. 790), Peradeniya, Nov. 1868, see drawing." It has narrow gills, a small strict volva, and a pileus strongly radially black-fibrillose; its spores are 5-6 × 3·5-4 μ. Massee (*loc. cit.*) gave the dimensions of the spores, 3 × 2 μ.

Volvaria coleatus B. & Br. was Thwaites 709*, *cum icone*. The specimen is marked by Thwaites 709, without asterisk. The gills are narrow and the volva small; and the pileus is radially streaked with black fibrils, which tend to become free at the ends. The spores are 5 × 3 μ, not 3 × 2 μ as given by Massee.

All these three appear to be the same species. Berkeley and Broome stated that *Volvaria coleata* was closely allied to *Volvaria apalotricha* but differed in several important particulars. They did not, however, state what those particulars were.

Volvaria pseudovolvacea B. & Br. Pileus broadly convex, up to 5 cm. diameter, closely streaked with radial black-brown lines, white or greyish between ; flesh thin, white ; stalk up to 9 cm. high, 3 mm. diameter, white, slightly attenuated upwards, powdered, stuffed, almost solid ; gills narrow, equal, not crowded, margin entire ; volva usually small, thin, sheathing the stem, brownish white ; spores oval, inequilateral, 4-6 × 3-4 μ, or globose, 3-4 μ diameter. On the ground among dead leaves, or on wood.

The figures of *Volvaria apalotricha* and *Volvaria coleata* show specimens with pilei 2-3 cm. diameter, the total height of the fungus being 3·5-5 cms.

Volvaria microcoelia B. & Br. Berkeley and Broome separated this from Thwaites 709. There is no specimen in Herb. Peradeniya, and it has not been recognised again. The specimen in Herb. Kew has a pileus 12 mm. diameter, and a stalk 2·2 cm. high ; the stalk is thin and the volva small. It differs from the other species of *Volvaria* known from Ceylon in its spherical spores, 4-5 μ diameter.

According to Berkeley and Broome, the pileus is livid, clothed with scattered hairs, campanulate becoming plane, 1·2 cm. diameter ; stalk slender, 2·5 cm. high, 1 mm. diameter ; gills narrow, ventricose ; volva dark. As there was no painting of this species, the description of the colour must have been deduced from the dried specimen.

Volvaria glandiformis B. & Br. Pileus campanulate, then plane, 1·5 cm. diameter, centre umbonate, sulcato-striate up to the umbo, which is surrounded by a depressed ring, white, with a faint pink tinge, greyish in the centre, covered with long, silky, closely adpressed hairs ; stem 1·7 cm. high, 1·5 mm. diameter, equal, or expanding upwards, white, striate, solid ; gills pink, distant, thick, variously forked, equal, 1·5 mm. broad, rounded at each end ; volva somewhat bilobed, spreading, 4 mm. high, grey and silky externally; spores elliptic, 6-10 × 3·5-5μ. On the ground or on dead wood.

Berkeley and Broome described the pileus from the figure as ovate, estriate. The figure shows an unexpanded example, but the dried specimens are sections of two, one partly and one fully expanded, and in the latter the pileus is plicato-sulcate. The spores on the herbarium specimens are 5-8 × 3·5-4·5 μ ; those on recent examples, from which the

above description has been drawn up, were 8-10 × 4-5 μ. The recent specimens grew on the ground ; Thwaites's painting appears to show a specimen growing on wood.

PLUTEUS

Berkeley and Broome enumerated twenty-one species of *Pluteus* in the Fungi of Ceylon, all, as far as information is available, being collected at Peradeniya or in the close vicinity. In Thwaites's time, the Botanic Gardens were maintained in a "natural" condition, fallen trees being left to decay. Consequently, it is probable that, at that period, *Plutei*, and other agarics which grow on wood, were more abundant at Peradeniya than they are now. At the present day, *Plutei* are comparatively scarce, except for three species,—*Pluteus spilopus* B. & Br. which is frequent round decaying stumps ; *Pluteus glyphidatus* B. & Br., fairly common on decaying palm fronds in dense shade; and *Pluteus stigmatophorus*, which springs up occasionally round decaying stumps in flower pots at the Laboratory.

Pluteus spilopus B. & Br. Pileus up to 10 cm. diameter, almost plane, slightly obtusely umbonate, blackish brown, with darker radial streaks, minutely squarrose in the centre, elsewhere innately radially silky when dry, the cuticle becoming somewhat subgelatinous in very wet weather ; flesh white, moderately thick. Stalk up to 10·5 cm. high, usually attenuated upwards, up to 1·5 cm. diameter at the base, and 1 cm. at the apex, but more or less equal in dwarf specimens, solid, brittle, longitudinally striate, covered with black fibrils and minute black-brown particles in clusters. Gills free, ventricose, rounded behind, rather distant : cystidia on the edge of the gills, flask-shaped, up to 48 μ high, 26 μ diameter below, 8μ diameter above, or fusiform, up to 72 μ high, 26 μ diameter, or clavate, 40-50 × 16 μ. Spores globose, 5-7 μ, or broadly oval, 5-9 × 4-7 μ, smooth.

This species grows in numbers round decaying stumps, *i.e.* on the ground, not on the wood. It also occurs singly on lawns, probably from buried wood. Examples which appear during the rains are up to 11 cm. high, and the cuticle tends to become subgelatinous and to separate in flakes. Those which spring up in drier weather are only about half that height, and the surface of the pileus is dry and innately silky or fibrillose. Berkeley and Broome referred the wet weather form to *Pluteus cervinus*, while they described the drier weather form as *Pluteus spilopus*. It appears to be distinct from *Pluteus cervinus* in the squarrose centre of its pileus and the black points and fibrils on the stalk.

Pluteus spilopus is on record as a British species If, however, the British examples are correctly represented by Plate 325 of Cooke's Illustrations, there would not appear to be any doubt that they are not *Pluteus spilopus*. The two upper figures of the plate in question are marked M.J.B.,and they are apparently intended to be copies of Berkeley's figures of the Ceylon *Pluteus spilopus*. Thwaites sent paintings of the Ceylon agarics, and Berkeley had copies of these made which are now in the Library of the Kew Herbarium. Cooke appears to have copied the figures of *Pluteus spilopus* from Berkeley's copies, but they have been decidedly modified in the process.

The original painting evidently represents a distorted example. The pileus is bilobed, and the two halves are bent down on either side of the stalk, so that the painting of the whole fungus shows not only the upper surface of one half of the pileus, but also part of the lower surface of the other half. The furrow round the obtuse umbo, which was taken to be one of the distinguishing characters of the species, is no doubt attributable to the distortion of the pileus ; it does not occur in recent examples. There is no indication of any wood on the figures ; the specimens apparently grew on the ground. The colour of the pileus is very dark, the radial streaks being almost black. Cooke's reproduction omits the reverse view of the hinder half of the pileus, adds a piece of wood to the base of the stalk, and changes the colour completely.

Pluteus glyphidatus B. & Br. Pileus campanulate, obtuse, then expanded, umbonate, up to 5 cm. diameter, lemon yellow, covered with minute, ashy, or grey, close-set warts or points, or streaked with ashy fibrils, the centre remaining yellow, elsewhere becoming pinkish, margin striate; flesh thin, white. Stalk up to 6 cm. high, 4 mm. diameter, pale yellow or white, equal or slightly attenuated upwards, glabrous, powdered, tomentose at the base, solid. Gills yellowish, then pink, free, distant, broadly ventricose or equal, rounded at both ends, margin serrate ; cystidia on the gill edge in tufts up to 150 μ high, individual cystidia cylindric, flask-shaped, or broadly conoid, up to 150 μ high, 40 μ diameter, those on the face of the gills scattered, cylindric, slightly attenuated above, or broadly oval, 50 μ high, 30 μ diameter. Spores Indian red in mass, globose, 5-7 μ diameter, or broadly oval, 5-6 × 4 μ.

Common on decaying palm fronds on rubbish heaps in the shade, Peradeniya. The colour of the pileus varies, some examples being yellow with only a slight ashy covering, while in others the grey streaks almost entirely hide the yellow. The stalk is usually pale yellow, but some examples have a white stalk. A form occurs without any trace of yellow in the pileus or stalk.

Pluteus stigmatophorus B. & Br. Pileus up to 3·5 cm. diameter, broadly convex or almost plane, centre depressed, becoming repand and subinfundibuliform, black-brown in the centre, the cuticle elsewhere broken into minute black-brown scales or points arranged somewhat radially, pallid, then pinkish, between the scales. Stalk white or pallid, subtranslucent, up to 3·5 cm. high, 3 mm. diameter, equal or slightly expanded upwards, stuffed then hollow, glabrous above, with a few fibrils below which turn blackish when handled, or mealy with minute black granules, base slightly white tomentose, often swollen. Gills free, ventricose, rounded at both ends, white then pink ; cystidia on the edge of the gills in scattered groups forming more or less conical fascicles, ovate, up to 24 μ high, 16 μ diameter, or flask-shaped, 60 μ high, 20 μ diameter below, 6 μ diameter above, minutely verrucose, usually with an amorphous cap. Spores pink in mass, smooth, globose, 4-7 μ, or broadly oval, 5-7 × 4-5 μ. On dead wood, Peradeniya.

I know this species only from examples which develop on stumps of tea and rubber kept in pots under bell glasses at the laboratory. These are usually small. The type painting shows a larger specimen, 4 cms. high, 3·5 cm. diam., markedly repand. There is very little difference between the type paintings of *Pluteus stigmatophorus* and *Pluteus escharites*, and the former was re-described under the latter name in Ann. Perad., VI, p. 314. It differs from *Pluteus escharites*, as far as can be determined from the herbarium specimens, only in the shape of the cystidia.

The cystidia collapse and are difficult to detect on dried specimens. There is only one sheet, Thwaites 918. in Herb. Kew, and this bears halves of two specimens, and median longitudinal sections of three. The spores on the specimen examined by me were smooth, globose, 4-5 μ diameter.

Pluteus pulvinus B. & Br. Recent specimens which are considered to belong to this species have a pileus up to 4 cm. diameter, broadly campanulate, obtusely umbonate, pale greyish brown and minutely squarrose in the centre, elsewhere lightly radially streaked with greyish brown, innately radially silky, sulcato-striate at the margin. The flesh is very thin, practically absent except over the stalk. The gills are rather distant, ventricose, very broad (up to 7 mm.), free, but close to the stem, white, then salmon pink. The stalk is curved, white, longitudinally striate, glabrous, solid, up to 3·5 cm. high, 3 mm. diameter. The spores are globose, 5-6 μ diameter, or broadly oval, 5-6 × 4-5 μ, Indian red in mass when moist. It has scanty cystidia, flask-shaped, up to 50 μ high, 16 μ diameter. The specimens grew on the standing trunk of a dead jak tree.

Berkeley and Broome described *Pluteus pulvinus* as " Pileo convexo fortiter umbonato striato particulis pulveraceis consperso ; stipite subaequali solido ; lamellis latis ventricosis approximatis." They cited Thwaites 757***, *cum icone*. There is, however, no figure of this species in Herb. Kew or Herb. Peradeniya. Thwaites 757** and 757*** were sent together on the same sheet, and there is a figure of the first of these only, viz. *Pluteus conizatus*.

Pluteus balanatus B. & Br. This was described from a painting of an unexpanded specimen. The fully-expanded pileus is up to 3 cm. diameter, membranous, broadly convex, depressed in the centre, sulcato-striate on the outer half, diaphanous, pinkish when moist, becoming ashy or faintly yellowish in the centre on drying. The centre is usually smooth, but may be broken into small scales.

The gills are free, rather distant, very ventricose, up to 5 mm. broad, diaphanous then pinkish. The stalk is white, translucent, pruinose, up to 2 cm. high, 3 mm. diameter, slightly attenuated upwards. The spores are globose, 4-6 μ diameter, or oval, 8 × 6 μ. The cystidia on the edge of the gills are ovoid, 40 μ high, 16 μ diameter, or flask-shaped, 40 μ high, 14 μ diameter below, 6 μ diameter above. On examination of the fresh specimens with a lense, the faces of the gills appear to bear cystidia, but these prove to be projecting hyphae, up to 100 μ long and 4 μ diameter. The recent specimens grew on wood.

A previous spore measurement on fresh specimens gave the dimensions, 7-8 × 5-6 μ, broadly oval, or 7 μ, globose.

Pluteus eugraptus B. & Br. Pileus up to 3 cm. diameter, plane, with a strongly developed, obtuse umbo, tawny, centre yellow brown, striate almost to the umbo ; flesh thin. Stalk up to 2 cm. high, 2-3 mm. diameter, expanding upwards, glabrous, yellow brown, white internally, stuffed, slightly tomentose with white tomentum at the base. Gills pink, ventricose, broad (4 mm.), rather distant, free. Spores pink, narrow oval, 7-9 × 4μ. On dead wood.

The type appears to be immature, and the spores found in it were oval, 4 × 3 μ. Berkeley and Broome gave the spores as subglobose or broadly elliptic, 6 μ long.

Pluteus flavo-marginatus Petch, Ann. Perad., VII, p. 282. Pileus about 2 cm. diameter, convex, sometimes slightly umbonate, orange red, sometimes with deeper crimson radial streaks, margin yellow. Gills white, then pink, broad, somewhat ventricose, free. Stalk up to 3·5 cm. high, 2 mm. diameter, yellow, glabrous, slightly tomentose at the

base. Spores pink, subglobose, 5-6 × 4-5 μ. Frequent at Hakgala on dead wood.

This species does not appear to have been collected by Thwaites, probably because the majority of his agarics were collected at Peradeniya, where this apparently does not occur.

Pluteus chrysaegis (B. & Br.) Petch; *Entoloma chrysaegis* B. & Br. Fungi of Ceylon, No. 182. Pileus 2·5-4 cm. diameter, broadly convex, golden yellow, fuscous in the centre, becoming brown when old, glabrous, margin striate, feebly sulcate when old, edge pale; flesh thin, white, becoming yellow. Stalk up to 3·5 cm. long, 2-3 mm. diameter, slightly attenuated upwards, white, becoming yellowish at the base, longitudinally striate, sometimes twisted, powdered below, glabrous above, solid. Gills free, crowded, rounded behind, up to 4 mm. broad, equal, white then pink. Spores salmon pink in mass, globose, smooth, 4-6μ diameter. On decaying stumps, Peradeniya.

The type painting shows the centre of the pileus depressed. *Pluteus conizatus* B. & Br., according to the figure of the latter, has an umbonate pileus and yellow stalk.

Pluteus escharites B. & Br. Judging from the type painting, this species closely resembles *Pluteus stigmatophorus*, and the descriptions of the two species do not reveal any marked differences. Berkeley and Broome cited Thwaites 868, *cum icone*, as the type. In Herb. Kew there are three collections under this number. On one sheet, the pilei are striate up to half way to the centre; on another they are feebly striate; and on the third strongly striate. The Ceylon label is attached to the second of these, which is nearest the type figure in general stature, though none of the specimens is the one from which the figure was drawn, that being Thwaites 868 in Herb. Peradeniya. The first of the three sheets is *Pluteus stigmatophorus*, while the specimens on the third have strongly angular spores and are an *Entoloma*.

Pluteus escharites has smooth spores, either globose, 4-5 μ, or oval, 6×4 μ; and the microscopic structure of the cuticle is similar to that of *Pluteus stigmatophorus*. But it differs from the latter in having globose cystidia, 15-17 μ diameter, or obpyriform cystidia, 15 × 21 μ, scattered over the face of the gills and along their edges. It has not been collected recently. Massee stated that *Pluteus escharites* had no cystidia, and that the spores were elliptic-fusiform, very minutely warted, 10 × 6 μ. It is possible that he may have examined the *Entoloma* specimens.

Pluteus phlebophorus Ditm. The Ceylon specimens attributed to this species were sent by Gardner, accompanied by a painting. The

specimens are *Oudemansiella apalosarca* (B. & Br.), and the painting is a good representation of small examples of that species.

Pluteus aglaotheles B. & Br. This was Thwaites 1189, with a painting. Berkeley and Broome noted that it had urn-shaped cystidia, and there is a figure of the cystidia with the type in Herb. Kew. These cystidia are cylindric, slightly inflated below, with a rooting base, or flask-shaped with a rooting base, the total length being about 56 μ and the diameter up to 15 μ ; the apex is divided into three or four conical spines, about 10 μ long. The spores are oblong-oval, apiculate at one corner, 5-8 × 3-4 μ, or globose, 5 μ. The pileus in the type is somewhat spongy, as noted as Berkeley and Broome, but it has been hollowed out by insects. Thwaites 917 was described by Berkeley and Broome as *Pluteus subcervinus*. Massee stated that it possessed cystidia, more or less ventricose, with the apex crowned by a varying number of spicules, but he did not notice that these were exactly the cystidia figured by Berkeley and Broome for *Pluteus aglaotheles*. The spores of *Pluteus subcervinus* are identical with those of *Pluteus aglaotheles*. Unfortunately there was no painting of *Pluteus subcervinus*. It was said to have a livid brown pileus, but that was deduced from the dried specimen. On the evidence of the spores and cystidia, *Pluteus subcervinus* and *Pluteus aglaotheles* are the same. This species has not been collected again.

Pluteus albolineatus B. & Br. This was described from Thwaites 757, and a painting. The figure shows a specimen of the stature of *Pluteus glyphidatus*, blackish brown with white radial streaks, the latter being due to the splitting of the surface layers of the pileus. On the dried specimen the dark narrow bands of the surface layer anastomose. The spores are globose, 4-5 μ diameter, or oval, 6 × 5 μ ; cystidia have not been found. Thwaites 757 was considered by him a mixture. To his number 915, he added the note, "sent before under No. 757, which comprised more than one species, I believe," and to No. 925, "sent before intermixed with 757, Compare No. 760 and 795." No. 915 was named *Pluteus psichiophorus* B. & Br.; its pileus is radially streaked, but the dark streaks are broken ; its spores are globose, 4-5 μ, or oval, 6 × 5 μ ; cystidia have not been observed in the herbarium specimens. No. 925 was named *Pluteus aeolus* ; its spores are globose, 4-5 μ, or oval, 5-6 × 4-5 μ : cystidia have not been found in the herbarium specimens ; the surface of the pileus is broken into minute black warts, sometimes radially arranged. Thwaites 760 bis was referred by Berkeley and Broome to *Pluteus nanus* P.; its spores are globose, 4-6 μ, or oval, 5 × 4 μ, and the surface of the pileus is split into minute black warts. *Pluteus brunneopictus* B. & Br. was Thwaites 916 ; Thwaites stated that it

differed only from 915 in the marking of the pileus when seen by transmitted light. There are apparently two species in the type of *Pluteus brunneopictus*, one with spores 4-6 × 3, and the other with spores 6-9 × 5 μ : the pileus of the former is streaked or split radially, while that of the latter is broken up into minute warts.

Thwaites sent figures of two of the above species only, viz. *Pluteus albolineatus* and *Pluteus brunneopictus*. The latter figure would appear to have been drawn from a specimen with the smaller spores ; Berkeley and Broome gave the spores as ovate, and 6 μ long. *Pluteus albolineatus* and *Pluteus brunneopictus* would appear to be different, but it seems very doubtful whether *Pluteus psichiophorus*, *Pluteus aeolus*, and the Ceylon *Pluteus nanus* are distinct from *Pluteus albolineatus*. None of these has been recognised recently.

Pluteus grandineus B. & Br. The type contains parts of two examples. Berkeley and Broome stated that the pileus was covered with minute powdery warts, but this is true only of one specimen, and the warts are masses of spores. The spores are oval, 6-8 × 5 μ, or globose, 5 μ. It appears to be a species of the stature of *Pluteus pulvinus* B. & Br., but its spores differ from those of the latter. It has not been collected recently.

Pluteus marmoratus B. & Br. This, from the figure, is a stout species, the stature of *Pluteus spilopus*, but differs from *Pluteus spilopus* in colour, and in growing on wood. The marbling of the pileus is probably due to insect borings. There is no specimen in Herb. Peradeniya, and I have omitted to examine the Kew specimens. It has not been recognised recently.

Pluteus pelinus B. & Br. The spores of this species are broadly oval, 7-8 × 5-6 μ, or globose, 5-6 μ. Cystidia were not found in the type. This is a small species, growing on wood. It has not been collected recently.

Pleutus fusco-nigricans B. & Br. This species would appear to resemble *Pluteus pulvinus* B. & Br., in its general shape, striate pileus, and broad gills, but the figure shows a much darker pileus, and its spores are 5-6 × 4-5 μ, broadly oval.

Pluteus conizatus B. & Br. This was said to have the surface broken up into minute powdery patches, at length leaving the substratum exposed in parts. It was sent with the specimens named *Pluteus pulvinus*,

and Berkeley and Broome stated that in the latter the cuticle did not chip off as in *A. conizatus*. The figure shows a large species, exactly the size and stature of the wet weather form of *Pluteus spilopus*, and it would agree with the latter in that the cuticle chipped off. But the coloration of the pileus is not that of *Pluteus spilopus*, and it has a yellow stalk, while the spores are globose, 4-5 μ, or oval, 5 × 4 μ, with a well-marked apiculus. Cystidia were not found on the herbarium specimen. This species would appear to be distinct from both *Pluteus spilopus* and *Pluteus pulvinus*. It has not been collected recently.

Pluteus flavipes Petch, n. sp. Pileus 1 cm. diam., broadly convex, almost plane, pale yellow-brown, rugulose, margin striate. Stalk 1·5 cm. high, 1 mm. diameter, pale yellow, translucent, glabrous, slightly attenuated upwards, base slightly bulbous. Gills rather distant, broad, ventricose, erose behind, free, but close to the stem. Spores globose, 5-6 μ diameter. Cystidia not found. On dead wood, Peradeniya, October 15, 1914 ; specimen and painting, No. 4180 in Herb. Peradeniya.

ENTOLOMA

Entoloma purpureum Petch, n. sp. Pileus up to 8 cm. diameter, conico-campanulate, becoming broadly conico-campanulate, apex obtuse or slightly depressed, deep violet purple, almost black in the centre, densely covered with minute violet black scales ; margin striate; splitting when old ; flesh thin, bluish white. Stalk up to 8 cm. high, 6 mm. diameter, bluish violet, paler than the pileus, or pale blue, sparsely fibrillose, equal, or attenuated upwards, usually curved at the base, densely stuffed, then partly hollow, white, becoming bluish or greenish, internally. Gills broad (up to 1 cm.), attenuated outwards, rounded or truncate behind, with a decurrent tooth, rather distant. Spores brownish pink in mass, angularly ellipsoidal, 10-14 × 7-8 μ. On the ground among dead leaves.

Berkeley and Broome referred this species (Thwaites 799) to *Entoloma ardosiacum* Bull., var. *agauum* B. & Br., and to *Entoloma griseocyaneum* Fr., var. coloribus saturatioribus. The painting of the former shows a violet purple pileus and an indigo-blue stalk, while in the painting of the latter both the pileus and the stalk are indigo-blue.

Entoloma iodnephes B. & Br. The type painting of this species shows specimens with a violet pileus, and a pale violet or almost white stalk. Two specimens are conico-campanulate, more acute than *Entolo-*

ma purpureum, while the third is repand and cyathiform. It might be taken for a form of *Entoloma purpureum*, but it is apparently caespitose, and has smaller spores, angular ellipsoidal, 6-8 × 4-5 μ. The cyathiform specimen has a fistulose stalk which is probably abnormal. Berkeley and Broome gave the dimensions of the spores 7·5-10 × 5-7·5 μ ; Massee stated that they were angularly globose, 8-10 μ.

Entoloma retroflexum B. & Br. The type painting of this species shows a pileus 1 cm. diameter, and a flexuose stalk, 3·5 cm. high, 1 mm. diameter. In the type specimen the gills are very thick, and are rather closely encrusted with masses of calcium oxalate. Berkeley and Broome stated that the spores were angular, but it would seem probable that crystals of calcium oxalate were mistaken for spores. Massee stated that the spores were globose, with a slight indication of angular irregularities, 5 μ diameter, and added that it was "undoubtedly a species of *Hebeloma* ; the gills are pale ochraceous-tan, the spores are also tinged with the same colour and do not show a trace of red or pink." Few spores are to be found on the co-type in Herb. Peradeniya. After dissolving away the crystals, the spores seen were oval, inequilateral, smooth, 6-8 × 3-4 μ ; no colour was observable in them, and it is quite possible that they may be white in mass. This species has not been collected again.

Entoloma chrysaegis B. & Br. This has been re-described as *Pluteus chrysaegis* in Ann. Perad., V, p. 271.

Entoloma rhodopolium Fr. The Ceylon fungus assigned to this species by Berkeley and Broome has been re-described as *Entoloma infundibuliforme* in Ann. Perad., VI, p. 315.

Entoloma sericeum Bull. Thwaites 869, *cum icone*, was referred to this species by Berkeley and Broome as var. stipite fibrilloso-farcto. No specimens resembling the figure have been collected recently. The spores are oval, nodular, with a short, conical apiculus, 10-12 × 5-8 μ.

Entoloma mazophorum B. & Br. The spores of this species are angular, quadrate with a large conical apiculus, or sub-pentagonal, 9-10 × 6-7 μ. It has not been collected again.

Entoloma microcarpum B. & Br. This species was re-described in Ann. Perad., III, p. 255. Patouillard, Bull. Soc. Myc. France, XXIX, p. 210, refers it to *Mycena*.

Entoloma intermixtum B. & Br. The specimens named thus by Berkeley and Broome are larger specimens of *Entoloma microcarpum*.

Entoloma stylophorum B. & Br. This was re-described in Ann. Perad., VI, p. 315.

Entoloma pallido-gilvum B. & Br. There was no painting of this species, and Berkeley and Broome did not give the colour, except that the whole plant became umber in drying. The name, however, was probably derived from Thwaites's note on the specimen, "whole plant pale gilvous." The spores are more or less quadrate with a prominent conical apiculus, or pentagonal, 6-8 × 5 μ. Massee gave the spores as broadly pyriform, apiculate at the base, even, or sometimes very slightly angular, 6 × 5 μ. They are certainly angular. This species has not been recognised again. It would appear to be rather close to *Entoloma mazophorum*.

Entoloma argilophyllum B. & Br. There was no painting of this species, and the statements concerning its colour must have been based on the dried specimen. Berkeley and Broome stated that there might be some doubt as to the proper position of this species as they had not seen the spores. They described the gills as beset with little dark particles. The vertical section looks very much like that of a *Marasmius*, and the gills are distant, forked, and united by cross veins here and there.

Massee gave "spores elliptical, smooth, 8 × 5 μ, pale dingy ochraceous; cystidia cylindrical, 70-80 × 12-14 μ, abundant. The present species is a true *Hebeloma*; gills very ventricose, 2 lines broad in the middle, deeply sinuate, and almost free, dry and thin, pale dingy tan."

The cystidia are up to 80 μ long, 16 μ diameter above, contracted rather suddenly at about one third their height into a stem-like base, 5 μ, diameter, thick-walled, minutely verrucose. The dark particles noted by Berkeley and Broome are brown, and are shortly cylindrical, up to 10 μ long, 8 μ diameter, or irregularly ovoid. They readily break up into irregular fragments, and are the contents of cells which just reach the surface of the gill or project slightly above it. The same coloured masses occur in the stalks of the cystidia. Spores were not found on the type specimen. Massee would appear to have measured the brown masses. This species has not been recognised again.

Entoloma crassipes Petch, n. sp. Often caespitose; when young, convex, slightly umbonate, margin regular and incurved, becoming depressed or feebly umbonate, wavy, margin irregularly decurved, or

repand, up to 10 cm. diameter, white or cream-coloured, sometimes faintly ochraceous in the centre, smooth. Stalk stout, up to 11 cm. high, 3 cm. diameter, equal, or fusiform, or expanding upwards, white, at first fibrillose, the outer layers frequently splitting so that the stalk is lacunose, solid, white and spongy internally, base white tomentose. Gills rather distant, narrow, attenuated outwards, sinuato-decurrent, edge often irregular, white, becoming pale pink. Spores pale pink in mass when dry, but with a brown tinge when wet, very pale brown by transmitted light, oval, coarsely warted, 5-7 × 3-4 μ.

This is a common species among dead leaves or on rubbish heaps at Peradeniya, but I have not been able to trace it among the specimens described by Berkeley and Broome.

Entoloma brunneum Petch, n. sp. Pileus up to 3 cm. diameter, convex, or conico-convex, with a prominent rounded umbo, pale brown or bay brown, clothed with minute squarrose scales, especially in the centre, and minutely radially silky ; margin uneven, striate when old ; flesh thin. Stalk 6-7 cm. long, 3-5 mm. diameter, slightly attenuated upwards, of the same colour as the pileus, with a few dark fibrils, longitudinally striate, twisted, base white and tomentose, internally white, stuffed then hollow. Gills distant, broad, ventricose, in three series, the longer sinuato-adnate, white, then pallid, finally pink. Spores Indian red in mass when moist, pale red when dry, angular, generally quadrilateral in plan, 8-12 μ broad, guttulate. Cystidia not found. On the ground among grass, Peradeniya, Nov. 14, 1911 ; No. 3272 in Herb. Peradeniya.

The shape of the pileus is that of *Entoloma mazophorum*, but the colour is different, the stalk longer, and the spores larger and different in shape.

LEPTONIA

Leptonia gnaphalodes B. & Br. Pileus 2 cm. diameter, almost plane, centre umbilicate, greyish brown, with paler radial streaks. minutely scaly, especially in the centre. Stalk 2·5 cm. high, 1·2 mm. diameter, expanding at the apex, greyish pallid, pellucid, feebly longitudinally fibrillose, base white tomentose. Gills moderately distant, ventricose, adnate with a decurrent line. Spores pink in mass, angular with a short conical apiculus, 8-12 × 6-8 μ. Cystidia not found. On the ground.

Leptonia gnophodes B. & Br. Pileus up to 3 cm. diameter, deeply infundibuliform with a plane or decurved margin, or convex, or conico-

convex, sometimes truncate above, when moist deep brown, glabrous, strongly striate, becoming grey with the surface split into small, innate, dark grey scales when dry. Stalk up to 6 cm. high, 3mm. diameter, greyish brown, pellucid, glabrous, pruinose at the apex, equal, or expanding upwards, often flattened at the apex, curved and white tomentose at the base, hollow, brown internally. Gills broadly ventricose, or with the lower edge even, pinkish brown with a pale edge, adnate, or adnate with a decurrent tooth, or decurrent. Spores angularly globose, 8-12 μ diameter, or oval, 8-10 × 6-8 μ. Cystidia flask-shaped, inflated at the apex, or nine-pin shaped, up to 64 μ high, 12-24 μ diameter below. On the ground among grass, sometimes in a ring.

This species occurred in my garden at Peradeniya, and the various shapes described are from specimens from the same patch. Normally it is infundibuliform, but some specimens are convex or conico-convex. In some forms it is rather *Eccilia*.

Berkeley and Broome described this species from Thwaites 841 *cum icone*, and stated that it was mixed with *Leptonia serratulus*. There were three paintings, which they named *Leptonia gnophodes*, *Leptonia serratulus*, and *Leptonia serratulus* var. with a solid stem. The last named is undoubtedly the same as *Leptonia gnophodes*. The figure assigned to *Leptonia serratulus* is bluish grey. This coloration does occur in some stages of drying in *Leptonia gnophodes*, and the figure could not be separated from the others on that character. But it also shows dark blue points on the gill edge, a feature which I have not observed in *Leptonia gnophodes*.

NOLANEA

Nolanea apiculata Petch, n. sp. Pileus up to 2 cm. diameter, broadly campanulate or almost plane, with an acute umbo sometimes produced into a cylindrical tip about 1 mm. high, sometimes depressed round the umbo, blackish brown, paler at the margin, radially silky, striate when moist, thin, almost membranous. Stalk up to 4 cm. high, 2 mm. diameter, pale brown, slightly attenuated upwards, glabrous, or with a few longitudinal fibrils, strigose at the base, cartilaginous. Gills brown then pink, moderately crowded, ventricose, rounded or attenuated behind, free but close to the stem. Spores pink, nodular, angularly oval with a long conical apiculus, 8-12 × 5-7 μ. On the ground, Peradeniya, October 18th, 1914; specimens and painting, No. 4189 in Herb. Peradeniya.

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Agaricaceae Pleuropodes Zeylanicae

BY

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The following list includes descriptions of the species of *Pleurotus*, *Claudopus*, and *Crepidotus* recorded for Ceylon by Berkeley and Broome, and of other species of the same genera recently collected.

PLEUROTUS

Pleurotus reticulatus Petch, Ann. Perad., VI, p. 198. Stalked; pileus 6-12 cm. diameter, infundibuliform, outer half at first decurved, then almost wholly infundibuliform, yellow brown in the centre, yellow or brownish yellow elsewhere, blackening in the centre and becoming paler at the margin when old, glabrous, margin not striate; total height 6-9 cm.; flesh white over the gills, becoming yellow over the stalk. Stalk 3-3·5 cm., high, 1-1·4 cm. thick, equal, expanding into the pileus, expanding slightly at the base, golden yellow, reticulated with red brown lines of innate fibrils, solid, slightly tomentose at the base, excentric, internally golden yellow or golden brown. Gills yellow, becoming pallid when old and turning green on drying, decurrent, continued down the stem in lines of four lengths which frequently anastomose, crowded, broad, arcuate, edge slightly irregular. Spores white, globose or broadly oval, 4·5-6 μ diameter. On dead wood, Hakgala, April 1912, September 1914; type, No. 3536 in Herb. Peradeniya; painting, No. 4132.

Pleurotus dryinus P. This species was recorded for Ceylon by Berkeley (Hooker's London Jour. Bot., VI, pp 479-514) among the fungi sent by Gardner, No. 88. There is no specimen in Herb. Kew, and the paintings No. 88, sent by Gardner, are marked "Hantane (no specimen)". The figures show a deeply infundibuliform species which has narrow, crowded gills and a central stalk, with a collar on the stalk. They are quite a good representation of *Lentinus Sajor-Caju*. The name *Pleurotus dryinus* should therefore be deleted from the Ceylon list.

Pleurotus angustatus B. & Br., Fungi of Ceylon, No. 141. Caespitose or scattered; pileus violet grey, sometimes amethyst, at first,

paler towards the base, becoming pale livid brown when old and sodden, orbicular, sometimes circular, or spathulate, sometimes obliquely infundibuliform, glabrous, upper layer subtranslucent, up to 8 cm. diameter, or 10 × 5 cm., margin at first inrolled. Flesh white, thin except over the stalk. Stalk stout, excentric, sometimes almost lateral, but in the latter case margined above by a continuation of the pileus without gills, up to 4 cm. high, 1·3 cm. diameter, white, even or ridged or reticulated, glabrous or nearly so. Gills dead white, rather crowded, decurrent or occasionally sinuato-decurrent, narrow. Spores white, oblong-oval, slightly inequilateral, 8-12 × 4-5 μ.

Pleurotus flabellatus B. & Br., Fungi of Ceylon, No. 145; *Pleurotus scytocephalus* B. & Br., Fungi of Ceylon, No. 146; *Pleurotus leptogramme* B. & Br., Fungi of Ceylon, No. 147. Caespitose or scattered, often arising in tufts from an extended basal stroma; white, or white with a pinkish tinge, or in dry weather, mouse grey above with salmon pink gills; flabelliform, orbicular, or reniform, with a short stem-like base, sometimes shortly stalked, glabrous when moist, innately radially silky in dry weather, or becoming tomentose towards the base, margin entire or lobed, up to 11 × 7 cm. Gills white, rather crowded, decurrent usually to the base of the pseudostalk, sometimes anastomosing below; base of pseudostalk, or stalk if present, tomentose or strigose. Spores white, oblong-oval, inequilateral, apiculus excentric, 6-10 × 3-4 μ.

There are two forms of this species, which are distinct in habit, but do not appear to be distinguishable by any definite morphological characters. One of these grows on fallen branches, or decaying palm stems, or stems of soft wood trees, *e.g.*, dadap; in this form the fungus is usually white, rarely pinkish behind, thin, tender, often lobed and undulating, glabrous when moist, with a matt surface when dry, and occurs singly, or in tufts of two or three connate at the base, but without a definite basal cushion. The second form occurs on wounds caused by fire injury, etc., on living trees, *e.g.*, *Hevea*, and arises in large clusters from stout basal cushions which often originate from cracks or beetle-holes and extend for some distance over the surface of the wood. This second form is stouter, and examples which appear in the drier weather towards the close of the rains are mouse grey with a slight pinkish tinge above, and salmon pink below. The pink colour soon fades.

The pileus in wet weather appears glabrous, but in drier weather innately radially silky. As the pilei age, a slight tomentose growth extends from the base towards the margin. Specimens which appear radially silky when fresh have a matted, finely tomentose surface when dry, except near the margin.

From the descriptions and specimens, *Pleurotus flabellatus* is the thin, tender form, while *Pleurotus leptogramme* is the stouter form with a well-developed basal cushion. The latter was apparently described from specimens on which the thin tomentose covering was well developed, but glabrous specimens occur in the type collection. The fine lines towards the margin, noted by Berkeley and Broome for *Pleurotus leptogramme*, appear only on drying; they may extend radially to the margin almost from the base and depend upon the condition of the fungus when gathered.

Pleurotus scytocephalus was said to differ from *Pleurotus flabellatus* in having smaller spores, 6 μ long. This measurement is within the limits of the dimensions of the spores of the latter. The type of *Pleurotus scytocephalus* in Herb. Kew contains two small specimens, which appear to be merely immature examples of *Pleurotus flabellatus*.

Pleurotus versiformis Berk., Hooker's London Jour. Bot., VI, p. 479. Berkeley's description is as follows.—Hygrophanous, white ; pileus membranaceous, umbilicate, infundibuliform, flabelliform, spathulate, or sub-linear ; stalk short, glabrous or sprinkled with a few strigose fascicles, sulcate, cartilaginous when dry ; gills rather broad, attenuated behind, decurrent, interstices rugulose. Like *Pleurotus petaloides*, but not closely allied ; might rather be referred to *P. mutilus*.

Gardner's specimen is in Herb. Kew. It was apparently gathered in bad condition and is scarcely recognisable. It might be *P. flabellatus*, but the description does not fit that species.

Pleurotus polychromus B. & Br., Fungi of Ceylon, No. 143. Orbicular, convex, strongly elevated and sub-umbonate behind, up to 3·5 cm. broad and 3 cm. long, deep purple-brown, becoming red-brown towards the margin, extreme margin pale or white ; when old entirely red brown ; glabrous when moist, very minutely silky when dry ; margin inrolled at first ; flesh thick, white. Stalk excentric, almost lateral, short, stout, up to 4 mm. high, 4 mm. diameter, minutely tomentose. Gills white, becoming spotted red where bruised, blackening in drying, rather crowded, narrow, no cystidia. Spores white, narrow-oval, inequilateral, 4-6 × 2- 3 μ.

Pleurotus rigescens B. & Br., Fungi of Ceylon, No. 142. This species was described by Berkeley and Broome from Thwaites 695, *cum icone*, numbers 97 and 88 in part being also cited. Thwaites 695 is undoubtedly *Pleurotus polychromus*, and the figure is that species ; the colour of the pileus is red brown. The figure from which Berkeley and Broome described *Pleurotus polychromus*, Thwaites 960, is the

younger stage, the pileus being purple-brown. In Herb. Peradeniya, Thwaites 88 and 695 are mounted on one sheet ; the specimens include *Pleurotus polychromus*, *Pleurotus testudo*, and a *Marasmius*. In Herb. Kew, *sub Pleurotus rigescens*, are Thwaites 695, 87, 88, and 97. No. 695 is *Pleurotus polychromus* ; No. 87 is *Crepidotus phaeophyllus* Berk.; No. 88 is a *Marasmius*. I regret that I have mislaid my notes on No. 97, and that number is apparently not represented in Herb. Peradeniya. Berkeley and Broome's description, however, is drawn up chiefly from Thwaites 695, which is *Pleurotus polychromus*, but in view of the confusion of specimens under *Pleurotus rigescens*, it would seem preferable to retain the former name.

Pleurotus galeaeformis B. & Br., Fungi of Ceylon, No. 144. Berkeley and Broome's description of this species is as follows,- Pileus 1·8 cm. across and as much high, oblique, helmet-shaped, thin, striate, pale in front, rufous behind ; stalk cylindric, 2 lines high, not a line thick, polished, arising from a fuscous, orbicular base ; gills broad, pale ochraceous, interstices veined. Thwaites No. 1207, *cum icone*, was cited. There is no figure, No. 1207, in Herb. Peradeniya, nor among the copies in Herb. Kew. The type in Herb. Kew contains a specimen and a half, resembling in shape *Favolaschia bispora*, but stalked.

Pleurotus pseudobarbatus Petch, n. sp. Sessile, orbicular or flabelliform, up to 2 × 1·5 cm., pale ochraceous, becoming dark-brown when old, covered behind with white spongy tomentum, which becomes fasciculate in front, margin glabrous; tomentose round the base ; gills pallid, becoming pale brown to grey brown, the longer broad and ventricose, the shorter lower, so that the gills appear more or less distant, margin lacerate ; spores white, broadly oval or subglobose, 4 × 3 μ. On a dead branch, Peradeniya, June 25, 1919 ; specimen and painting, No. 6016 in Herb. Peradeniya.

The white tomentum forms a spongy layer, with a smooth outer coat, but in front is broken up into scattered erect fascicles ; it is composed of hyphae 2 μ diameter, usually thin-walled. The gills are rather thick, and their context contains irregularly distorted, thick-walled or almost solid hyphae, 3-4 μ diameter.

Pleurotus testudo Berk. Pileus semi-elliptical or orbicular, regular, up to 2·5 cm. broad, sometimes irregularly lobed and up to 5 × 2·5 cm., sessile, convex, more or less umbonate at the point of attachment, grey or brownish grey, paler towards the margin, becoming brown when old and sodden, sometimes white, tomentose behind with minute, erect,

scattered fascicles of white hairs, margin faintly radially striate. Flesh subgelatinous, but the pileus not viscid. Gills rather distant, narrow, white, becoming brown when old, bearing numerous prominent cystidia. Cystidia fusoid, 50-70 μ long, 12-14 μ diameter, the free part conical or flask-shaped, thick-walled below, solid or with a narrow central cavity above, yellow in dried specimens. Spores white, oblong, ends rounded, 5-7 × 2·5 μ.

This species is not uncommon at Peradeniya. It was sent to Berkeley by Gardner, and was described in Hooker's London Journal of Botany, VI, p. 484. In the Fungi of Ceylon, Berkeley and Broome stated that it is *Agaricus barbatus* B. & C. in part, and refer to Cuba, No. 44. But it was described before any Berkeley and Curtis specimens, and so cannot be any of their species in part. Moreover, Wright's specimen No. 44 in Cuban Fungi is *Pleurotus barbatulus* B. & C., described in 1859.

In Saccardo, Sylloge, XI, p. 62, it is stated, on the authority of Cooke, that *Pleurotus testudo* is a *Crepidotus*. That is incorrect.

Pleurotus sub-barbatus B. & C., Journ. Linn. Soc., X, p. 288. Sessile ; flabelliform, orbicular, or elongated, up to 1 cm. diameter, slate coloured to blackish brown, densely strigose with coarse, greyish, adpressed fascicles from the base over two-thirds or three-quarters of the pileus, feebly silky, appearing glabrous, over the marginal zone ; margin radially striate when moist. Gills brownish black, crowded, narrow : no cystidia. Spores white, oval or oblong-oval, 5-6 × 3·5-4 μ. The strigae extend over the wood round the base of the fungus ; they consist of thick-walled, hyaline hyphae, 2-3 μ diameter, sometimes united into long, brown, tapering fascicles, 30 μ diameter.

Pleurotus semisupinus B. & Br., Fungi of Ceylon, No. 151. Sessile : at first globose, with a minute central orifice, then expanded, circular, saucer-shaped, up to 3 mm. diameter, with a white, tomentose, central papilla, about 0·3 mm. diameter; white, hymenium becoming tan coloured; externally densely radially strigose. Gills distant, subventricose, attenuated behind, arising near the central papilla, covered with crystals of calcium oxalate ; cystidia fusoid, with a long point, 24-26 × 8-12 μ, or obconoid or irregularly triangular, up to 30 μ high, including a curved horn, 6-12 μ long, at each corner. Spores oval, inequilateral, 4-6×2-2. 5 μ. Hairs on exterior hyaline, flexuous, thick-walled, 2-3 μ diameter.

Pleurotus gelatinosus Petch, n. sp. Pileus up to 1 cm. diameter, sessile, usually circular and centrally attached, sometimes orbicular

and attached laterally, subgelatinous, pale slaty grey, becoming dark slate, and finally blackish brown or black, pruinose round the point of attachment, the pruina appearing rusty on dried specimens ; margin even when young, becoming crenate when old ; black internally. Gills moderately crowded, rather broad, at first grey, then dark slate, finally blackish-brown with a pale grey edge ; no cystidia. Spores white, globose, 4-5 μ diameter.

This species was Thwaites 391, and was included by Berkeley and Broome under *Pleurotus subbarbatus* B. & C. as " a tender variety which comes very close to *A. striatulus*. This at length collapses and clings close to the matrix. " The " collapsed " position, flat on the wood, is the natural habit.

SCHIZOPHYLLUM

Schizophyllum commune Fr. Berkeley and Broome enumerated two species of *Schizophyllum* from Ceylon, viz. *Schizophyllum commune* Fr. and *Schizophyllum multifidum* Fr. Bresadola, in Ann. Myc., IX, p. 549, refers to the second as " *Schizophyllum commune* var. *multifidum* (Batsch) Fr. in Berk. Fung. Ceylon, No. 430. " These are merely forms of the same species. It is not possible to maintain the second distinct, even as a variety. The spores of *Schizophyllum* are white or pale yellow in mass, hyaline by transmitted light, oblong-oval or cylindric, with the apiculus at one corner ; measurements at Hakgala (5600 ft.) gave the dimensions, 4-6 × 2 μ, at Peradeniya (1600 ft.) 5-7 × 2·5-3 μ.

CLAUDOPUS

Claudopus fusco-lamellatus Petch, Ann. Perad., VI. p. 200. Sessile; orbicular or flabelliform, up to 7 × 5 cm., cream coloured, smooth behind, sometimes slightly tomentose towards the margin ; margin incurved ; gills slightly fuscous, blackening in drying, narrow, crowded ; spores salmon pink in mass, oval, inequilateral, 4-5 × 2-3 μ. On a decaying tree trunk, Hakgala, April 1914 ; No. 4061 in Herb. Peradeniya.

Claudopus repens Petch, Ann. Perad., VII, p. 282. Resupinate, sessile, orbicular, up to 4 mm. diameter ; margin white, tomentose ; hymenium pinkish red ; gills few, distant ; spores irregularly globose, nodular, with a stout conical apiculus, 6-8 × 4-6 μ. On the under side of rotting logs, arising from white cords of mycelium which spread out here and there into cobwebby sheets. Hakgala, December 1917 ; No. 5621 in Herb. Peradeniya.

CREPIDOTUS

A. Spores smooth

Crepidotus flavomarginatus B. & Br., Fungi of Ceylon, No. 238. Shortly stalked ; pileus at first galeate, becoming convex or almost plane, orbicular, 1-1·6 cm. broad, pale yellow, pale ochraceous, or orange, clothed with adpressed flocci, sometimes glabrous, sometimes united behind to the substratum by a tuft of white hyphae when old ; stalk excentric, stout, up to 2 mm. long, 1 mm. diameter, of the same colour as the pileus, becoming brown, floccose, generally arising from a tuft of white or yellowish hyphae ; gills broad, ventricose, adnate or sinuato-adnate, yellow, becoming brown, margin yellow and serrate; spores yellow brown, smooth, broadly oval, 7-9 × 5-7 μ, or globose, 6-8 μ : edge of gills furnished with short clavate hairs, up to 20 μ high, 1·5 μ diameter at the base, 5 μ diameter at the apex, apex rounded. General at Peradeniya.

A specimen from Hakgala (No. 6146) has dark yellow-brown spores.

Crepidotus phaeophyllus Berk., Decades of Fungi, No. 152. Shortly stalked ; pileus flabelliform, simple, about 2 × 1 cm., or deeply lobed, up to 4 × 2 cm., convex, then almost plane, white or pallid when moist, tan coloured when dry, glabrous ; stalk excentric, almost lateral, short, white, usually arising from a tomentose patch ; gills crowded, very narrow, attenuated outwards, the longer adnate, pallid, then purple grey or purple, dark purple brown to black when dry ; spores distinctly purple in mass when moist, pale purple by transmitted light when fresh, yellow brown in herbarium specimens, oval, smooth, 6 × 4 μ. Peradeniya ; not common.

Both this and the following species are remarkable for the purple coloration of the spores under certain conditions.

Crepidotus melleus (B. & Br.) Petch ; *Aschersonia mellea* B. & Br., Fungi of Ceylon, No. 798. Sessile or shortly stalked : pileus regular, semi-elliptic, convex, or orbicular, reniform, or flabelliform, repand and undulating, up to 7 × 5 cm., white, ochraceous behind, becoming tan coloured when dry, glabrous, with slight white tomentum at the base, sometimes viscid when moist ; margin at first inrolled, appearing striate when moist ; flesh thick, white ; stalk short, up to 3 mm. long, white, longitudinally fibrillose, expanding upwards, excentric ; gills moderately crowded, broad, sometimes ventricose, decurrent or adnate, pallid, becoming purplish grey, or brown from the spores ; spores in mass dark purple brown when moist, tawny olive (Ridgway) when dry, pale purple or yellow brown by transmitted light, smooth, oval, slightly in-

equilateral, thick-walled, 6-10 × 4-8 μ; edge of gills fringed with cylindric or slightly clavate hairs, 6 μ long, 3 μ diameter. Common on decaying tree trunks, especially mango, at Peradeniya.

This is the commonest *Crepidotus* at Peradeniya, but it was not described by Berkeley and Broome. There are specimens of it, however, included in Thwaites 954 in Herb. Peradeniya.

Aschersonia mellea B. & Br. consists of small specimens of the same species.

In dry weather, the pileus may be semi-elliptic, convex, with an incurved margin, and the gills pallid, becoming purple grey. The spore print from such specimens is purple brown, and the spores by transmitted light pale purple. But when dried for the herbarium the spores are yellow-brown.

In wet weather, the pileus is repand, and flabelliform or orbicular. The gills are white or pallid, becoming brown when covered with spores. The masses of spores on the pilei, and the spore print when moist, are dark purple brown, the latter becoming tawny olive when dried on white paper. By transmitted light, the spores are yellow brown, with sometimes a faint purple tinge in the thick wall.

Crepidotus grumosopilosus B. & Br., Fungi of Ceylon, No. 239. Very shortly stalked or sessile, orbicular, up to 3 × 2·5 cm., convex, densely covered when young with coarse suberect fascicles of tawny strigae, becoming white when expanded, with scattered radial fascicles of tawny fibrils behind, silky with a few red brown points in front : stalk very short, excentric; gills ventricose, very broad, rather distant, white then brown ; spores pale yellow brown, smooth, broadly oval or subglobose, 7-10 × 5-6 μ. On dead branches, Peradeniya.

The strigose fascicles on the pileus are composed of parallel hyphae united laterally ; these hyphae are 8 μ diameter, sometimes inflated to 10 μ, constricted or not at the septa, with close-set, regular, internal annular thickenings.

Berkeley and Broome cite Thwaites 954a, *cum icone*. Thwaites 954 was a mixture, including *Crepidotus epicrocinus* B. & Br., *Crepidotus grumosopilosus* B. & Br., a species said to be a variety of *Crepidotus epicrocinus*, and another species which does not appear to have been named. It is very doubtful whether the figure is that of the specimens described by Berkeley and Broome as *Crepidotus grumosopilosus* ; it would appear to be more probably *Crepidotus truncatus*.

Crepidotus pezizula B. & Br., Fungi of Ceylon, No. 343. Sessile; usually centrally attached, at first globose, becoming pezizoid, up to 2

mm. diameter, exteriorly ashy, with a pinkish tinge, minutely tomentose, hyphae of the tomentum hyaline, minutely spinulose ; gills pale brown with a white edge, rather distant ; edge of gill bearing hairs up to 20 μ high, 2μ diameter below, hyaline, clavate, expanding to 3 μ above, or suddenly inflated into a globose head 6 μ diameter ; spores yellow brown, smooth, broadly oval, 6-9 × 4-6 μ.

This species is parallel to *Pleurotus semisupinus* B. & Br.

B. Spores warted or spinulose

Crepidotus hepatizon Berk., Decades of Fungi No. 151. Fasciculate, stalked ; pileus horizontal, at right angles to the stalk, orbicular, flabelliform, or reniform, up to 6 × 4 cm., convex, then plane or undulating, frequently proliferous at the margin when old, bay brown behind, greyish brown towards the margin, becoming ferruginous, minutely hoary ; stalk vertical, excentric, almost lateral, up to 2·5 cm. high, 5 mm. diameter, cartilaginous, compressed and lacunose, solid, glabrous, tomentose at the base, pale purplish brown ; gills ferruginous, crowded, ventricose, sinuato-decurrent ; spores yellow brown, spinulose, oval or subpyriform, 4-5 × 3 μ, or globose, 3-4 μ diameter. Apparently rare ; on rotten wood, Alagalla, July 1917 ; specimen and painting, No. 5238 in Herb. Peradeniya.

The habit of this species, with an erect stout stalk and the pileus at right angles to the stalk, is quite different from that of the other Ceylon species of *Crepidotus*.

Crepidotus velutinus Petch, n. sp. Stalked ; pileus orbicular, convex, up to 2 × 1 cm., deep yellow brown or chocolate coloured, minutely areolated, velvety, clothed with minute, erect, yellow brown, flask-shaped or conical hairs, up to 30 μ high ; stalk almost lateral, stout, 2·5 mm. diameter, fuscous, minutely velvety, with a ring of white tomentum at the base ; gills pallid, then pale brown, somewhat distant, slightly ventricose, decurrent ; spores dark brown in mass, yellow brown by transmitted light, spherical, 6-10 μ diameter, coarsely warted with large scattered warts. On a dead twig, Peradeniya ; specimen and painting, No. 4316 in Herb. Peradeniya.

Crepidotus citrinus Petch, n. sp. Shortly stalked ; pileus at first galeate, margin inrolled, then almost plane, orbicular, up to 2 × 1 cm., pale yellow or lemon yellow, pruinose, sometimes white behind, lying flat on the substratum and ultimately attached by white hyphae ; margin plicato-crenate, sometimes lobed ; stalk very short, excentric, curved, yellow, minutely tomentose ; gills rather distant, broad, edge pale and

serrate, yellow, then brownish yellow ; spores yellow-brown, spherical, 5-8 μ diameter, or oval, 8-10 × 6-8 μ, covered with large blunt spines. On dead trunks, Peradeniya ; type No. 3547 in Herb. Peradeniya. There is an unnamed specimen of this, Thwaites 956, in Herb. Peradeniya.

Crepidotus reversus B. & Br., Fungi of Ceylon, No. 343. Sessile or shortly stalked ; pileus deep pink or red, becoming brownish red towards the margin, orbicular, convex, up to 7 × 5 mm., scurfy, with a patch of white tomentum behind and extending over the substratum, margin at first incurved; gills at first deep pink, then red brown, rather distant ; cystidia on the edge of the gills oblong, sometimes inflated in the middle, up to 24 × 12 μ ; spores pale ferruginous in mass, pale yellow brown by transmitted light, coarsely warted, globose, 5-7 μ diameter, or broadly oval, 6-8 × 4-6 μ. On dead branches, Peradeniya.

In dried specimens, the pileus bears minute, scattered, deep crimson granules visible under a magnification of 40 diameters. The gills bear similar but smaller granules, visible when mounted.

Berkeley and Broome's type specimen contains only very minute examples, about 1 mm. diameter.

Crepidotus epicrocinus B. & Br., Fungi of Ceylon, No. 237. Sessile, attached almost laterally by white strigae ; pileus suborbicular or reniform, up to 2·5 cm. broad, convex, pale yellow, with red, more or less radiating streaks, minutely tomentose with loose, irregularly intertwined hyphae ; hyphae of the tomentum thick-walled, irregularly contorted, rather closely septate ; gills pale yellow, becoming ferruginous ; spores yellow brown, warted, with scattered warts, spherical, 4·5-7 μ, or subglobose, 6 × 5 μ.

This species has not been collected again. Berkeley and Broome stated that the pileus was bright orange-chrome-yellow. The colours given above are those of the type figure.

Crepidotus truncatus Petch, n. sp. Sessile, dorsally attached ; pileus elliptical, lobed behind, broadly convex, 4 × 2·5 cm., pallid, covered with a thin layer of matted fibrils, strongly tomentose and white at the point of attachment, striate from the margin over half the pileus when moist ; gills not crowded, very broad (up to 1 cm.), ventricose, pallid then brownish, truncate behind, terminating at an excentric, white, tomentose area under the point of attachment ; spores ochraceo-ferruginous in mass, pale yellow brown by transmitted light, globose, minutely warted (appearing smooth under a magnification of 360 diameters), 5-7 μ. On a dead branch, Peradeniya ; No. 4384 in Herb. Peradeniya.

The specimens referred to by Berkeley and Broome as a variety of *epicrocinus* with a dull ferruginous pileus and broader gills has similar minutely warted spores which appear smooth under a magnification of 400 diameters, but they are larger, either spherical, 7-9 μ, or oval, 8-10 × 6-8 μ. The pileus in these specimens is sessile, dorsally attached, minutely adpressed tomentose, and the gills are broad.

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Cassia Leschenaultiana DC.

BY

T. Petch, B.A., B.Sc.

WITH ONE PLATE.

In his "Enumeratio Plantarum Zeylaniae" Thwaites included *Cassia Wallichiana* DC., with the description "Caule erecto, rigido, parce ramoso; foliolis 20-25-jugis, oblongo-linearibus, aristato-mucronatis; glandula paullo supra medium petioli subsessili; pedicellis supra-axillaribus, fasciculatis; staminibus 10, valde inaequalibus"; and added the note "Sufficiently distinguished from the preceding species (i.e. *Cassia mimosoides* L.) by the darker colour of the stems and foliage, the much larger leaves, shorter pedicel, and the different shape and position of the petiolar gland."

In Flora British India, vol. II, Baker placed *Cassia Wallichiana* as a variety of *Cassia mimosoides*. Trimen, in the Handbook of the Flora of Ceylon, adopted the same view, doubtless following the Flora British India, since he noted that he would prefer, with Thwaites, to regard it as a distinct species. He stated, "it is a very common weed about Kandy, and very distinct in appearance, having red-purple stems and blue-green foliage."

The above is the only form of *Cassia mimosoides* which occurs at Peradeniya. At higher elevations, *e.g.*, at Hakgala, var. *auricoma* is common, but this dies out when cultivated at Peradeniya. Thwaites C. P. 1510, which is accepted as the typical plant, is also from an upcountry district.

Some years ago, seed of *Cassia mimosoides* was brought in from India for trial as a green manure, and the resulting plants were so different from the common Ceylon var. *Wallichiana* that observations were made with a view to re-establishing the latter as a species, if possible. A subsequent reference to the literature, however, showed that Indian official botanists had already decided that *Cassia mimosoides* var. *Wallichiana* was worthy of specific rank, though it was still carried on in Ceylon lists under the old varietal name.

King, in "Materials for a Flora of the Malay Peninsula" (Jour. Asiatic Soc. Bengal, LXVI, 1897), distinguished var. *Wallichiana* as *Cassia Leschenaultiana*, and gave the following differences.

Cassia mimosoides. Leaflets linear, minute, ('15 inch long) ; pedicel 1 inch, bracteolate above the middle ; pod 20-25-seeded ; stamens all fertile, alternately long and short.

Cassia Leschenaultiana. Leaflets oblong, ('4 inches long, ·15 inches wide); pedicels ·3 inches, bracteolate below middle ; pod 8-16-seeded ; stamens unequal, one to three upper often sterile.

In " Some Additional Leguminosae " (Jour. Asiatic Soc. Bengal, LXVI, pt. II. No. 2, 1897), Prain published the following note on *Cassia mimosoides.*

"Var. 2. *Wallichiana,* as to *citation,* consists of two very distinct plants, both of which, as it happens, are mixed under Wall. Cat. 5320.

" One of these is the same plant as *C. myriophylla* Wall. Cat. 5326—and is no doubt a mere variety of *C. mimosoides* distinguishable, with difficulty in many cases, by its rather longer leaflets. Like the type it has small flowers with apparently always ten stamens, and has the petiolar gland deeply embedded in the leaf stalk.

" The other is the plant described by Mr. Baker as var. *Wallichiana,* easily distinguished by its larger flowers ; in this plant often only nine, sometimes only seven, of the stamens are perfect, and the petiolar gland, though not stalked, protrudes distinctly above the upper surface of the leaf stalk. The best name for the species is *C. Leschenaultiana* DC.

"Var. 3 *auricoma* is only a more hirsute condition of the preceding. It is equivalent to *C. Macraei,* but it should not be separated as more than a variety from *C. Leschenaultiana.* "

The name to be adopted for the Ceylon plant which was considered distinct by Thwaites and Trimen is consequently *Cassia Leschenaultiana.* But what passes for *Cassia mimosoides* var. *auricoma* in Ceylon is certainly not a variety of *C. Leschenaultiana.*

Cassia Leschenaultiana (Fig. 1) is common in the neighbourhood of Peradeniya. It is erect, with a stout stem up to 5 mm. diameter, sparingly branched above, with suberect branches, and attains a height of two-and-a-half, or sometimes three, feet. It is notable among the smaller Cassias for its intense coloration, its stems being deep purple-red and its leaves dark blue-green. The leaves appear uniformly green, whereas in *C. mimosoides* the leaves, at least when young, appear to have a pale band bordering the rachis on either side, *i. e.,* the bases of the leaflets appear to be paler than the outer parts.

In outline, the leaf of *C. Leschenaultiana* is ovate, the length of the leaflets in the same leaf varying from 10 to 16 mm. In a typical leaf, the length of the leaflets, eighteen in number, on one side, (ignoring the terminal bristle), were, beginning from the base, 11, 13, 15, 15·5, 16, 16, 16,

15·5, 15·5, 15, 15, 14, 13, 13, 12, 11, 10, 10 mm. respectively. The lowest leaflets are almost perpendicular to the rachis, while those in the middle make an angle of about 65° with it.

In *Cassia mimosoides* the leaf is parallel-sided (Fig. 2), the leaflets are about 1 mm. broad, and the acute tip is in continuation of the upper edge. In *C. Leschenaultiana*, the leaflets are up to 3 mm. broad, with a bristle-like tip about 1mm. long, situated below the upper edge (Fig. 3).

The outstanding difference between *Cassia Leschenaultiana* and *Cassia mimosoides* is the shape of the gland of the petiole, as noted by Thwaites. The position of the gland is also different, as a rule, in the two species, though the difference is not sufficiently constant to be diagnostic. In *Cassia mimosoides*, the gland is situated so that its upper edge is at the level of the insertion of the lowest leaflets, or it may be half a millimetre below that. In *Cassia Leschenaultiana*, the gland, if only one is present, is about two millimetres below the lowest pair of leaflets, but if, as frequently happens, two glands are present, one of them is situated in the first position noted for *Cassia mimosoides*.

The gland of *Cassia mimosoides* is sessile, oval in plan, and pulvinate (Fig. 5). That of *C. Leschenaultiana* is bucket-shaped, being circular in plan, with sides gradually sloping outwards, like an inverted truncate cone, and usually slightly concave on the upper surface (Fig. 4).

In *Cassia Leschenaultiana* the sepals are yellow, with a yellow-green stripe down the centre. In general, they are reflexed when the flower opens. The petals are orange-yellow, and the two upper* have a red spot at the base. The open flower is cup-shaped, and up to 12 mm. in diameter.

The flowers are either right- or left-styled on the same plant. Only one flower of a cluster is open at one time. Sometimes all the flowers which are open at the same time on a given branch are either all right-styled or all left-styled, but more usually both right- and left-styled flowers are open on the same branch at any given time.

The number of perfect stamens varies from eight to ten, but is usually ten. A count of 118 flowers gave 103 with ten stamens, 14 with nine stamens and one staminode, and 1 with eight stamens and two staminodes. The stamens are arranged in two whorls, the five of the inner whorl being shorter that those of the outer. The five stamens of the outer whorl are not all the same length ; two are about 7 mm. long, one about 5 mm., and the remaining two about 4·5 mm. Those of the inner whorl are more approximately equal, varying in the same flower from 3 to 3·5 mm. In the right-styled flower, as seen when fully

*The terms upper and lower are used here with reference to position as seen in the expanded flower.

expanded, the lowest stamen of the outer whorl is 7 mm. long, with a purple-red anther, yellow towards the base, and a yellow filament. Proceeding clockwise round the flower, the next stamen of the outer whorl is like the first, but the third, though its coloration is the same, is only 5 mm. long. The remaining two stamens of the outer whorl are 4·5 mm. long, and have yellow anthers, tipped with purple-red, and purple-red filaments. Thus in these two, the coloration of anther and filament is reversed. The five stamens of the inner whorl are yellow, slightly tipped and streaked with purple red. When the number of perfect stamens is less than ten, one, or both, of the two lowest stamens of theinner whorl is reduced to a staminode. The staminode is, as a rule, linear, ending in a fine point, but sometimes it terminates in a short, obconic, two-pored, anther-like tip.

The arrangement of the stamens in the expanded flower is as follows. The three longer stamens of the outer whorl follow the curve of the petals. The lowest of these runs more or less alongside the pistil, diverging slightly from it, and sometimes curving at the tip so that the open end of the anther almost touches the stigma. The other two form a similar pair, diametrically opposite, so that the three stamens and the pistil together form an acute-angled cross lying obliquely across the flower (Fig. 6). The two remaining shorter stamens bend together over the centre of the flower, almost perpendicular to the pistil. Of the stamens of the inner whorl, three follow the pair of long, coloured stamens which form one side of the cross, one follows the paired stamen and pistil which form the other side, and the remaining one follows the shortest, paired, yellow stamens of the outer whorl. Alternatively, both the latter stamens of the inner whorl may follow the paired stamen and pistil.

This is evidently the flower considered under *Cassia Leschenaultiana* in Knuth, Handbuch der Blutenbiologie, III, Part I, p. 373, The diameter of the flower is there given as 12 cm., but, as it is stated that it is one of the small-flowered species, that measurement is probably an error for 12 mm. In accordance with Knuth's classification, the three longest stamens are there regarded as pollinating stamens and the other seven as catering stamens.

Cassia mimosoides

Typical *Cassia mimosoides* does not appear to be common in Ceylon. Thwaites' specimens were obtained in Pussellawa (? Uda Pussellawa) and Maturatta, and there is a specimen in Herb. Peradeniya collected by Smith at Bandarawela. I have found it growing luxuriantly in Uda Pussellawa, at an elevation of about 5000 ft., but it has not been collected at Hakgala (5600 ft.). With the exception of Pussellawa, which may

be an error for Uda Pussellawa, all these localities are outlying districts on the eastern edge of the central hills, *i. e.*, on the drier side.

In Uda Pussellawa, *Cassia mimosoides* sprawls over the ground with branches up to three feet in length, and a semi-shrubby growth in the centre of the plant, eight inches or so high. Its leaves and stems are rather pale green. Its leaves are long, narrow, and parallel-sided, up to 9 cm. long, with leaflets about 3 mm. long and 0·8 mm. broad. The consecutive leaflets, forty-seven in number, on one side of a typical leaf, from the base to the apex, measured 2·5, 3·25, 3·5, 3·75, 3·75, twenty-nine 4, 3·75, 3·75, five 3·5, 3·25, 3·25, 3, 3, 2·5, 2, to the nearest quarter millimetre.

The flower is up to 1 cm. in diameter. The sepals are red-brown down the centre, and the petals yellow, without any red spot. In most of the flowers examined, the stamens are all yellow, except for a faint reddish edge to the pores, but occasionally one of the outer whorl is slightly streaked with red. Of thirty-four flowers in which the stamens were counted all had ten stamens. Measurements on one flower showed the stamens of the outer whorl to be 5, 5, 5·5, 5, 4·5 mm. in length respectively, and those of the inner whorl, all 4 mm long. The pistil is median, and the stamens are irregularly curved, but more or less erect.

The bracts on the pedicel are distant from the flower. When in fruit, the tips of the bracts do not reach to the base of the pod, but terminate 1 to 1·5 mm. below it. The gland on the leaf stalk is situated just below the point of insertion of the lowest pair of leaflets, so that its upper edge is at the level of the point of insertion.

Cassia mimosoides var. auricoma

Cassia mimosoides var. *auricoma*, following the nomenclature of the "Flora of Ceylon," is common at Hakgala, but is a small plant there, with a procumbent stem, very slightly branched, and seldom more than eight inches long. In Uda Pussellawa, it is much larger, and has the habit and dimensions of *C. mimosoides*. It grows with the latter, but is immediately distinguishable in the field by its darker leaves and stouter stems, the latter being purple-red on the exposed side.

The leaves, as a rule, are parallel-sided, though in some cases they taper slightly towards the apex. They are shorter than those of *C. mimosoides*, usually about 5 cm. long, with leaflets 6-7 mm. long and about 1 mm. broad. The lengths of the successive leaflets, twenty-four in number, on one side of a leaf from the base upwards were 4·5, 5·5, 6, 6, 6·25, 6·5, 6·5, 6·5, 6·5, 6·5, 6·5, 6·5, 6·5, 6·25, 6, 6, 6, 6, 5·5, 5·5, 5·5, 5, 4·5, 4·5 respectively. The gland on the leaf stalk is of the same shape as that of typical *C. mimosoides*, but rather larger, and it

is situated either in the same position, or with its upper edge up to half a millimetre below the point of insertion of the lowest pair of leaflets.

The flower is about 6 mm. in diameter. The sepals are red-brown down the centre, and are not reflexed. The petals are yellow, without any red spot. The stamens are usually seven in number, with from one to three staminodes. One staminode is either rudimentary, or linear, and up to 2 mm. long ; its apex is usually acute, but it may be slightly expanded and compressed, and sometimes, though rarely, it resembles the other two. This staminode is situated at the lowest point of the flower, and represents the lowest stamen of the outer whorl. The other two staminodes are intermediate in character, and might be regarded as short stamens. They are about 2·5 mm. high, with a filament about half that length which expands above into an obconic, anther-like structure furnished with two apical pores. They differ from the stamens in the gradual transition upwards from filament to anther. These represent the two lowest stamens of the inner whorl. In some cases all the three staminodes are linear, in others two of them. Out of thirty-nine flowers, three had all three staminodes linear, and eight two of them linear ; in sixteen flowers one staminode was wanting, and in thirteen, two were absent. As a rule, when the full complement of staminodes is not present, it is those of the inner whorl which have disappeared. The linear staminode of the outer whorl is usually present.

An examination of seventy-seven flowers gave the following results.

9 stamens	1 staminode	2	flowers
8 stamens	2 staminodes	4	,,
8 stamens	1 staminode	3	,,
7 stamens	3 staminodes	22	,,
7 stamens	2 staminodes	16	,,
7 stamens	1 staminode	18	,,
6 stamens	3 staminodes	5	,,
6 stamens	2 staminodes	5	,,
6 stamens	1 staminode	1	,,
6 stamens	no staminodes	1	,,

The most usual number of perfect stamens is thus seven.

The pistil practically median, but the flowers are nevertheless right and left-handed. Of the four stamens of the outer whorl, two are highly coloured, purple-red, while the other two are yellow or slightly streaked. The two former are situated, either both on the right, or both on the left of the flower. Of the other two, the uppermost bends forward until its tip almost touches the stigma. All the other stamens stand more or less erect from the base of the flower. The stamens of the outer whorl differ in length, and one usually appears longer than the

others, but it is not always the longest which bends towards the stigma. In one flower in which the two coloured stamens were on the right, the lengths of the stamens of the outer whorl, beginning with the lowest on the left and proceeding clockwise were 4 mm., 5 mm., 4·25 mm., 4·25 mm.; in this case the stamen which curved forward was the longest (5 mm.). In another flower of the same structure, the lengths of the stamens were 4·5, 4·5, 5, 5 mm., so that the curved stamen was one of the shorter (4·5 mm.). In another flower, with the two coloured stamens on the left, the lengths were 4·2, 3·5, 3·5, 4·0 mm.; here again, the curved stamen (No. 3) was one of the shorter.

The filaments of the outer whorl of stamens are longer than those of *Cassia Leschenaultiana*, and vary from 1·5 to 0·75 mm. in length. The stamens of the inner whorl vary from 3·25 to 2·5 mm. in length and have filaments about 0·5 mm. long.

The Ceylon form known as var. *auricoma* agrees with *Cassia mimosoides* in the shape of the gland. If therefore *Cassia Leschenaultiana* is distinguished from *C. mimosoides* on the shape of the gland, the Ceylon var. *auricoma* must be regarded as a variety of the latter. But it differs from both *Cassia mimosoides* and *Cassia Leschenaultiana*, as known in Ceylon, in the smaller average number of stamens, and in this respect it agrees with *Cassia Leschenaultiana* as described by Prain.

The Indian form cultivated at Peradeniya agreed with the Ceylon var. *auricoma*. The number of perfect stamens was usually seven, that number occuring in eighty out of one hundred and four flowers examined. Like the Ceylon var. *auricoma* it did not flourish at Peradeniya, and died out in the third generation.

Thwaites considered that the Ceylon var. *auricoma* was probably worthy of specific rank on account of the position of the gland, and of the bracts on the pedicel. He stated that var. *auricoma* (*villosula*) had the bracts nearer the base of the flower than in the typical form of *C. mimossoides*, and the gland a little below, instead of between, the lowest pair of leaflets.

The latter feature is variable in var. *auricoma*, and the upper edge of the gland may reach the point of insertion of the lowest pair of leaflets, or be 0·5 mm. below that, on specimens from the same locality.

The position of the bracts is best judged when the plant is in fruit. In *Cassia mimosoides*, the tips of the bracts, as a rule, do not reach the base of the pod, but terminate about 1 or 1·5 mm. below it. In var. *auricoma* they extend up to, or above, the base of the pod. But specimens of the latter from Hakgala have the bracts in either position on the same plant.

It would appear, therefore, that var. *auricoma* cannot be separated from *C. mimosoides* proper on either of the characters enumerated by Thwaites.

EXPLANATION OF PLATE XII.

Fig. 1. *Cassia Leschenaultiana*, × $\frac{3}{4}$.
Fig. 2. Leaf of *C. mimosoides* × $\frac{3}{4}$.
Fig. 3. Leaflets of *C. Leschenaultiana* (upper), and *C. mimosoides* (lower) × $1\frac{1}{2}$.
Fig. 4. Gland of *C. Leschenaultiana*, × 4.
Fig. 5. Gland of *C. mimosoides*, × 9.
Fig. 6. The three long stamens and the pistil of *C. Leschenaultiana*, × 4.

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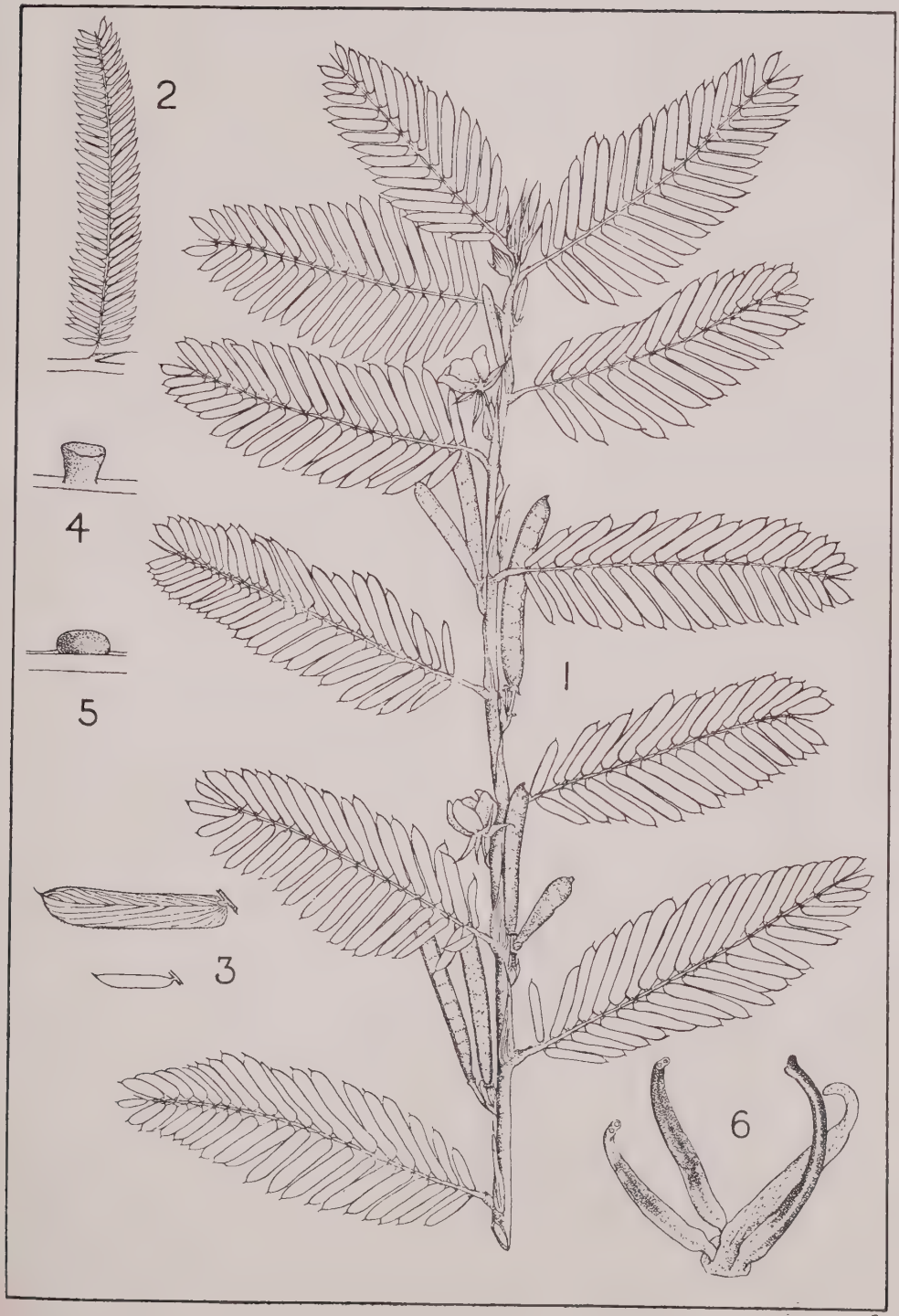
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Meristic Variation in Loranthus

BY

T. Petch, B.A., B Sc.

A few years ago, a specimen of *Loranthus ligulatus* Thw., sent in for identification from the Mannar district, was found to bear several flowers with six petals (corolla segments) in place of the normal five. Subsequently other flowers of this species, and those of other species of *Loranthus*, were examined in order to determine to what extent meristic variation occurred in the flowers of this genus in Ceylon.

Loranthus cuneatus Heyne

This is a common species in Ceylon in both the wet and the dry regions, and occurs also in South India. Specimens were collected at Peradeniya in March-April 1923, and examined by Mr. E. J. Livera.

5 petals, 5 stamens	1171
6 petals, 6 stamens	1

Loranthus ligulatus Thw.

This is a rare Ceylon endemic, which occurs in the northern part of the dry zone, chiefly on *Salvadora*. Flowers were collected from a number of plants at Mannar in February, 1923. Counts of the petals and stamens gave the following results,—

4 petals, 4 stamens	3	flowers
5 petals, 5 stamens	1324	,,
5 petals, 6 stamens	1	,,
6 petals, 5 stamens	1	,,
6 petals, 6 stamens	12	,,

Out of a total of 1341 flowers, 17, or 1·27 per cent., differed from the normal. The variation was chiefly in the direction of an increase in the number of parts.

Loranthus loniceroides L.

This species occurs in Ceylon and South India Flowers were collected at Hakgala in February-March, 1922. They were consequently the up-country variety, which, as noted by Trimen, may be a different species from the plant named by Linnaeus which Hermann collected

in the low-country. I have not seen low-country specimens. The Hakgala form is notable for the thickened lobes of the corolla, which in bud form a hard, bluish grey or slate-coloured, conical tip. The flowers gathered from eight plants gave the following numbers,—

5 petals, 5 stamens	2 flowers
6 petals, 6 stamens,	1045 ,,

The variation in this species is very small, and only abnormal flowers with a reduced number of parts were found.

Loranthus longiflorus Desrouss.

This species occurs in Ceylon, India, and Malaya. Flowers were collected at Mannar (near sea level, dry zone) in February 1923, at Peradeniya (1600 ft) during December 1921, from a plant on Pumelo, and at Hakgala (5600 ft) in February-March, 1922, from seven plants. The Hakgala form is assigned to var. *amplexifolius*. The count of the Mannar specimens was made by Mr. E. J. Livera.

	Mannar	Peradeniya	Hakgala
3 petals, 3 stamens	—	2	—
4 petals, 4 stamens	—	4	5
5 petals, 5 stamens	399	492	535
6 petals, 6 stamens	—	1	2

The variation is principally in the direction of a reduction of parts. The Mannar specimens showed no variation, the Peradeniya specimens 1·4 per cent. and the Hakgala specimens 1·3 per cent. The variation of the total number was slightly below 1 per cent.

Loranthus neelgherrensis W. & A.

This species occurs in South India and Ceylon, and is common in the latter country up to an elevation of 7000 feet. It is very common on fruit trees at Peradeniya. Specimens were collected at Peradeniya on Pumelo and on Mango in December 1921, on tea, cacao, etc., in the same locality in March 1923, and on Acacia at Hakgala in February-March, 1922. Counts of the 1923 Peradeniya specimens were made by Mr. E. J. Livera.

	Peradeniya 1921.	Peradeniya 1923.	Hakgala.
3 petals, 3 stamens	2	—	—
4 petals, 4 stamens	23	5	11
4 petals, 5 stamens	1	—	—
5 petals, 5 stamens	1043	333	753
5 petals, 6 stamens	1	–	–
6 petals, 5 stamens	1	– –	1
6 petals 6 stamens,	5		2

The variation is again principally a reduction. At Peradeniya, 3·07 per cent. of the first. collection and 1·8 per cent. of the second, and at Hakgala 1·83 per cent., of the flowers showed variation. The combined results give a percentage of 2·28. 7·7 per cent. of the abnormal flowers showed unequal variation of the petals and stamens.

Loranthus sclerophyllus Thwaites

A Ceylon endemic. Specimens were gathered at Hakgala in February-March 1922, from three plants.

5 petals, 5 stamens	840
6 petals, 5 stamens	1
6 petals, 6 stamens	18
7 petals, 7 stamens	1

The variation, as shown by these specimens, is solely in the direction of an increase of parts. 2·34 per cent. of the flowers showed variation.

Loranthus suborbicularis Thw.

A Ceylon endemic. Specimens were collected from several plants on *Rhododendron* at Hakgala in February-March, 1922, and in September 1923.

4 petals, 4 stamens	2
5 petals, 5 stamens	927

Loranthus tomentosus Heyne var. **incanus** Trimen.

Specimens were gathered at Hakgala in February-March, 1922.

4 petals, 4 stamens	24
5 petals, 5 stamens	653
6 petals, 6 stamens	5

3·96 per cent. of the flowers were abnormal. The variation was chiefly in the direction of a reduction of parts.

The variation in the flowers of *Loranthus* proved to be much smaller than had been expected. Three species, *L. cuneatus*, *L. loniceroides*, and *L. suborbicularis*, showed scarcely any modification from the normal in number of parts. The greatest variation occurred in *L. tomentosus* var. *incanus*, in which the abnormal flowers amounted to 3·96 per cent. *L. sclerophyllus* and *L. neelgherrensis* gave 2·34 and 2·28 per cent. respectively, *L. ligulatus* 1·27 per cent., and *L. longiflorus* slightly less than 1 per cent.

In general, the number of petals and stamens remained equal. Unequal numbers of stamens and petals were found only in 7 flowers out of a total of 10292.

Variation consisted principally of a reduction of parts. But in *L. ligulatus* the majority of the abnormal flowers, and in *L. sclerophyllus* all the abnormal flowers, had an increased number of parts.

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EDITORIAL NOTE.

The Annals of the Royal Botanic Gardens, Peradeniya, while retaining its present title, will, from the current volume, form Section A (Botany) of the Ceylon Journal of Science. Although the Annals will appear in future in this new form, there is no break in the series, and no change editorially or in other essential respects.

It is particularly requested, therefore, that all gifts of literature which hitherto have been made to the Department of Agriculture, Ceylon in exchange for the Annals should still be continued. All communications with regard to exchanges or any matter arising out of the present publication should be addressed to

The Director of Agriculture,
Peradeniya, Ceylon.

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CONTENTS.

Page.

Petch. T.—Revisions of Ceylon Fungi.....119

Livera. E. J.—The genus Cyanotis in Ceylon.....185

Livera. E. J.—Sansevieria zeylanica Willd.....191

Livera. E. J.—Plaesianthera.....195

Livera E. J.—The Jussiaeas of Ceylon.....199

Petch. T.—Ceylon Pink-Spored Agarics.....201

Petch. T.—Agaricaceae Pleuropodes Zeylanicae.....217

Petch. T.—Cassia Leschenaultiana DC.....229

Petch. T.—Meristic Variation in Loranthus.....239